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(71) Applicant(s)
Paula Frances Buchanan-Baillie-Hamilton
The Gart, CALLANDER, Perthshire, FK17 8LE,
United Kingdom

(72) Inventor(s)
Paula Frances Buchanan-Baillie-Hamilton
Julian Claude Peck

(74) Agent and/or Address for Service
Mewburn Ellis
York House, 23 Kingsway, LONDON, WC2B 6HP,
United Kingdom

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(54) Abstract Title

Determining the effect of compounds on the ability of a subject to control their weight and compositions to reduce the effect of such compounds

(57) A method of determining the extent of the effect of a target compound on the ability of a test subject to control their weight. The method comprises the steps of determining the degree or severity by which the compound affects each of a plurality of weight controlling systems present in the subject, determining the persistence of the compound in the subject and calculating the effect as a function of these values. The effect of target compounds including pesticides, environmental pollutants, organic solvents and heavy metals may be determined. Weight controlling systems that may be considered include the hormonal system, metabolism and muscular activity. A method of determining the effect of an item on the ability of a subject to control their weight comprises determining the amount in the item of a plurality of target compounds which effect the ability of the subject to control their weight. A method of determining the extent to which a subject has had their ability to control their weight inhibited comprises determining the amount in the subject of a plurality of compounds which have an effect on the ability of the subject to control their weight. Compositions to reduce the effect of one or more target compounds present in a subject which effect the ability of the subject to control their weight comprise one or more micronutrients or target compound absorbants which reduce the level of and/or counteract the effect of the target compounds. The compositions may be used in the treatment of obesity.

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Determination of Chemical Calorie Ratings Chart

	Hormone Alterations																	General Metabolism					Muscular Activity				Fatness Index						
Weight Controlling System	Noradrenaline	Adrenaline	Dopamine	Serotonin	Gaba	Hypothermia	Brown Fat	Thyroid Gland	Testosterone	Oestrogens	LH&FSH	Prolactin	Cortisol	Insulin	Growth Hormone	Leptin	Progesterone	Metabolic Rate	Reduced Metabolic Rate	ATPases	Carbmetab	Lipidmetab	Spont Decrease Activity	Reduced Muscle Strength	Muscle Damage	Protein Synthesis	Altered Appetite	Increase % Body Fat	Weight Gain (5 pts)	Feeding Centre Damage	Used to Gain Weight	B Adrenergic Damage	Chemical Calorie Rating
Weighting	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	1	1	1	
Chlormequat																																	
Corrected Severities	137.7	41.2																											268				
Weighted	275.4	82.4																											1340				1697.8
Aldicarb																																	
Corrected Severities	28.1	16.5																											54				
Weighted	56.2	33																											270				359.2

Figure 1

Severity Calculation Chart										
				Toxic Chemical :	Chlormequat					
				Maximum Half-Life in Human Body (hours) :	21					
				Longevity Index :	4.58					
				Average Concentration used in Trials (mg / kg) :	0.15					
		Animals Used in Trial	Proximity of Animals to Humans (Scale 1 to 5)	Typical Mass of Animals (kg)	Mass used in Trial (mg)	Actual Conc'n (mg / kg)	Human Equivalent Dosage (mg)	Raw Severity of Impact on WCS (DUs Scale 0 to 10)	Severity per unit Mass (DU / mg)	Proximity Weighted Severity per unit Mass (DU / mg)	Weight Gain ? (Y or N)
Data Source											
Weight Controlling System :	**Noradrenaline**										
Journal of ##### March 1998	Mice	3	0.1	0.02	0.2	14	4	0.29	0.86	Y
Proceedings of ##### 1987	Humans	5	70	7	0.1	7	6	0.86	4.29	Y
Journal of ##### Jan 1994	Salmon	1	N/A	N/A	N/A	10.5	8	0.76	0.76	N
	Total Proximity	9						Total	5.90	
								Proximity Weighted Average Severity per unit Mass	0.66	
								Longevity Index	4.58	
								Data Quality Index	45.80	
								Corrected Severity per Unit Mass (DU / mg)	137.70	
Weight Controlling System :	**Adrenaline**									
Proceedings of ##### June 1979	Mice	3	0.1	0.01	0.1	7	2	0.29	0.86	N
Journal of ##### May 2000	Chimps	4	25	5	0.2	14	3	0.21	0.86	Y
	Total Proximity	7						Total	1.71	
								Proximity Weighted Average Severity per unit Mass	0.24	
								Longevity Index	4.58	
								Data Quality Index	36.70	
								Corrected Severity per Unit Mass (DU / mg)	41.19	
Weight Controlling System :	**Weight Gain**									
Journal of ##### March 1998	Mice	3	0.1	0.02	0.2	14	10	0.71	2.14	Y
Proceedings of ##### 1987	Humans	5	70	7	0.1	7	10	1.43	7.14	Y
Journal of ##### May 2000	Chimps	4	25	5	0.2	14	10	0.71	2.86	Y
	Total Proximity	12						Total	12.14	
								Proximity Weighted Average Severity per unit Mass	1.01	
								Longevity Index	4.58	
								Data Quality Index	57.80	
								Corrected Severity per Unit Mass (DU / mg)	268.03	

Figure 2

Data Quality Index Calculation Chart

Steepness Factor : 0.055

Total Proximity	Data Quality Index
0	0.0
1	5.5
2	11.0
3	16.4
4	21.7
5	26.8
6	31.9
7	36.7
8	41.4
9	45.8
10	50.1
11	54.1
12	57.8
13	61.4
14	64.7
15	67.8
16	70.6
17	73.3
18	75.7
19	78.0
20	80.0
21	81.9
22	83.7
23	85.2
24	86.7
25	88.0
26	89.2
27	90.2
28	91.2
29	92.1
30	92.9
31	93.6
32	94.3
33	94.8
34	95.4
35	95.8
36	96.3
37	96.6
38	97.0
39	97.3
40	97.6
41	97.8
42	98.0
43	98.3
44	98.4
45	98.6
46	98.7
47	98.9
48	99.0
49	99.1
50	99.2
51	99.3
52	99.3
53	99.4
54	99.5
55	99.5
56	99.6
57	99.6
58	99.7
59	99.7
60	99.7

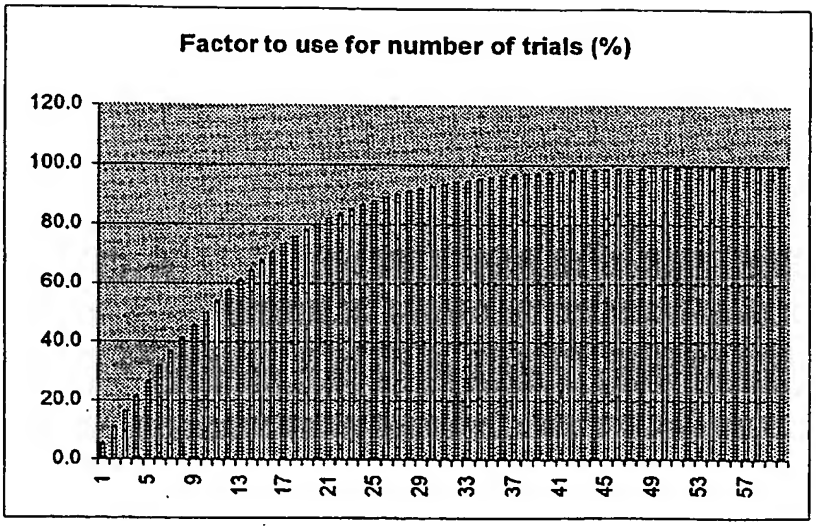


Figure 3a

Longevity Indices Conversion Chart

Half-Life		Half-life (hours)	Longevity Index = Half-life to the Power 0.5
From	To		
Zero	24 hours	0	0.00
I day	3 days	24	4.90
3 days	1 week	72	8.49
1 week	1 month	168	12.96
1 month	3 months	730	27.02
3 months	1 year	2190	46.80
1 year	3 years	8760	93.59
3 years	10 years	26280	162.11
10 years	Infinite	87600	295.97

Figure 3b

Determination of Chemical Calorie Ratings Chart

	Weight Controlling System	Hormone Alterations																									General Metabolism								Muscular Activity				Fatness Index							Results		
		Noradrenaline	Adrenaline	Dopamine	Serotonin	Gaba	Hypothermia	Brown Fat	Thyroid Gland	Testosterone	Oestrogens	LH&FSH	Prolactin	Cortisol	Insulin	Growth Hormone	Leptin	Progesterone	Metabolic Rate	Reduced Metabolic Rate	ATPases	Carbmetab	Lipidmetab	Sport Decrease Activity	Reduced Muscle Strength	Muscle Damage	Protein Synthesis	Altered Appetite	Increase % Body Fat	Weight Gain (5 pts)	Human Weight Gain (5 pts)	Feeding Centre Damage	Used to Gain Weight	B Adrenergic Damage	Initial Total Score	Longest Half-Life (Hours)	Chemical Calorie Rating
	Weighting	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	1	1	1			
Chlormequat																																														
	Raw Severities	10	10	8	8	8	8	4	7	3	4	2	6	6	8	6	0	3	0	2	8	8	8	8	8	8	8	6	1	6	0	0	2	10			
	Weighted	10	10	8	8	8	8	4	7	3	4	2	6	6	8	6	0	3	0	2	8	8	8	8	8	8	8	6	1	30	0	0	2	10	208	21	44
Aldicarb																																													
	Raw Severities	10	10	10	8	6	7	8	4	6	6	5	6	8	8	4	0	3	8	10	7	9	8	8	8	4	4	2	1	13	1	0	10	10			
	Weighted	10	10	10	8	6	7	8	4	6	6	5	6	8	8	4	0	3	8	10	7	9	8	8	8	4	4	2	1	65	5	0	10	10	268	100	268

Figure 4

Chemical Calories Calculation Table

Item - Mars Bars

Toxic Chemical	Concentration of Chemical (mg / kg)	Chemical Calorie Rating (DU / mg)	Total Chemical Calories (CC / kg)	Absorption Efficiency (%)	Chemical Calories Absorbed (CC / kg)
Chlormequat	0.1	1697.8	169.78	100	169.78
Aldicarb	4	359.2	1436.8	80	1149.44
Lindane	Negligible	N/A	0	N/A	0
DDT	Negligible	N/A	0	N/A	0
etc.					
etc.					
etc.					
Total Chemical Calories per kg of Mars Bars			1606.58		
Total Chemical Calories absorbed per kg of Mars Bars					1319.22

Item - Smarties

Toxic Chemical	Concentration of Chemical (mg / kg)	Chemical Calorie Rating (DU / mg)	Total Chemical Calories (CC / kg)	Absorption Efficiency (%)	Chemical Calories Absorbed (CC / kg)
Chlormequat	0.5	1697.8	848.9	100	848.9
Aldicarb	2	359.2	718.4	80	574.72
Lindane	Negligible	N/A	0	N/A	0
DDT	Negligible	N/A	0	N/A	0
etc.					
etc.					
etc.					
Total Chemical Calories per kg of Smarties			1567.3		
Total Chemical Calories absorbed per kg of Smarties					1423.62

Figure 5

pesticide name	chemical type
methalaxyl	alanine derivatives
chlormequat	ammonium compounds
dichlofluanid	anilines
diphenylamine	anilines
pendimethalin	anilines
tolyfluanid	anilines
propyzamide	benzamides
bromopropylate	benzilates
carbendazim	benzimidazoles
thiabendazole	benzimidazoles
procymidone	bicyclo compounds
2-phenyphenol	biphenyl compounds
biphenyl	biphenyl compounds
inorganic bromide	bromides
methyl-bromide	bromides
aldicarb	carbamates
carbaryl	carbamates
chlorpropham	carbamates
methomyl	carbamates
pirimicarb	carbamates
propamocarb	carbamates
propham	carbamates
dithiocarbamates	carbamates
imazalil	imidazoles
iprodione	imidazoles
folpet	indoles
captan	indoles
fenpropimorph	morpholines
chlorothalonil	nitriles
tecnazene	nitrobenzenes
2,4-D	organochlorine insecticides
chlordane	organochlorine insecticides
dicofol	organochlorine insecticides
hexachlorobenzene	organochlorine insecticides
propargite	organochlorine insecticides
DDT	organochlorine insecticides
dieldrin	organochlorine insecticides
alpha-HCH	organochlorine insecticides
beta-HCH	organochlorine insecticides
gamma-HCH	organochlorine insecticides
tetradifon	organochlorine insecticides

Figure 6

glyphosate	organophosphate compounds
hydrogen phosphide	organophosphate compounds
monocrotophos	organophosphate compounds
tolclofos-methyl	organophosphate compounds
chlorfenvinphos	organophosphate compounds
acephate	organothiophosphate compounds
azinphos-methyl	organothiophosphate compounds
chlorpyrifos	organothiophosphate compounds
chlorpyrifos-methyl	organothiophosphate compounds
diazinon	organothiophosphate compounds
dimethoate	organothiophosphate compounds
ethion	organothiophosphate compounds
etrimfos	organothiophosphate compounds
fenitrothion	organothiophosphate compounds
fenthion	organothiophosphate compounds
malathion	organothiophosphate compounds
methamidophos	organothiophosphate compounds
methidathion	organothiophosphate compounds
omethoate	organothiophosphate compounds
parathion	organothiophosphate compounds
parathion-methyl	organothiophosphate compounds
phorate	organothiophosphate compounds
phosalone	organothiophosphate compounds
phosmet	organothiophosphate compounds
pirimiphos-methyl	organothiophosphate compounds
pyrazophos	organothiophosphate compounds
quinalphos	organothiophosphate compounds
triazophos	organothiophosphate compounds
oxadixyl	oxazoles
vinclozolin	oxazoles
triforine	piperazines
endosulfan	piperidines
fenpropidin	piperidines
bifenthrin	pyrethrins
cypermethrin	pyrethrins
deltamethrin	pyrethrins
fenpropathrin	pyrethrins
fenvalerate	pyrethrins
flusilazole	pyrethrins
lambda-cyhalothrin	pyrethrins
permethrin	pyrethrins
maleic hydrazide	pyridazines
bupirimate	pyrimidines
fenarimol	pyrimidines
ethoxyquin	quinolines
prometryn	triazines
bitertanol	triazoles
paclobutrazol	triazoles
penconazole	triazoles
myclobutanil	triazoles-prob

Figure 6 Cont

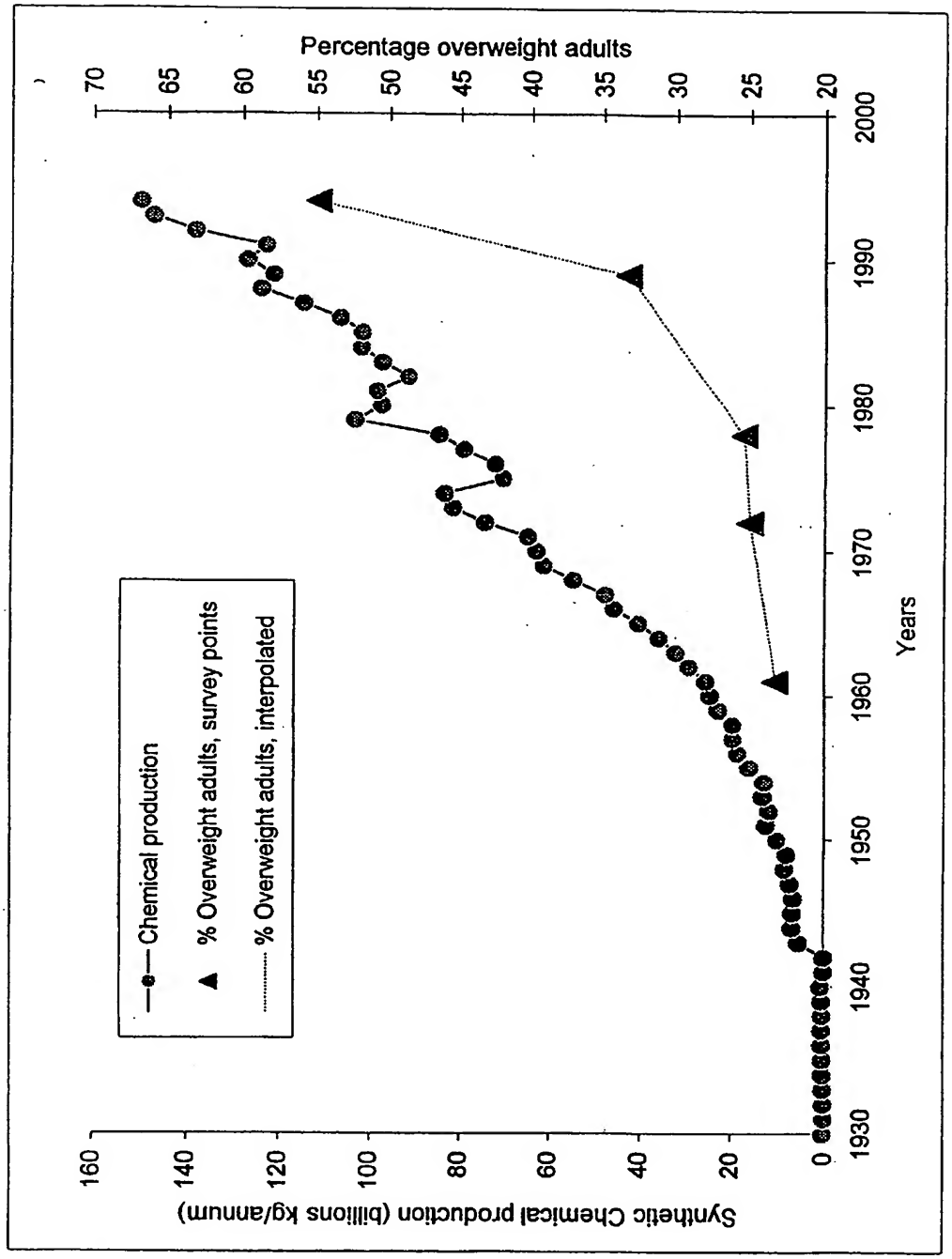

Percentage overweight adults
70
65
60
55
50
45
40
35
30
25
20
2000
1990
1980
1970
1960
1950
1940
1930
Years
Chemical production
% Overweight adults, survey points
% Overweight adults, interpolated
Synthetic Chemical production (billions kg/annum)
160
140
120
100
80
60
40
20
0

Figure 7

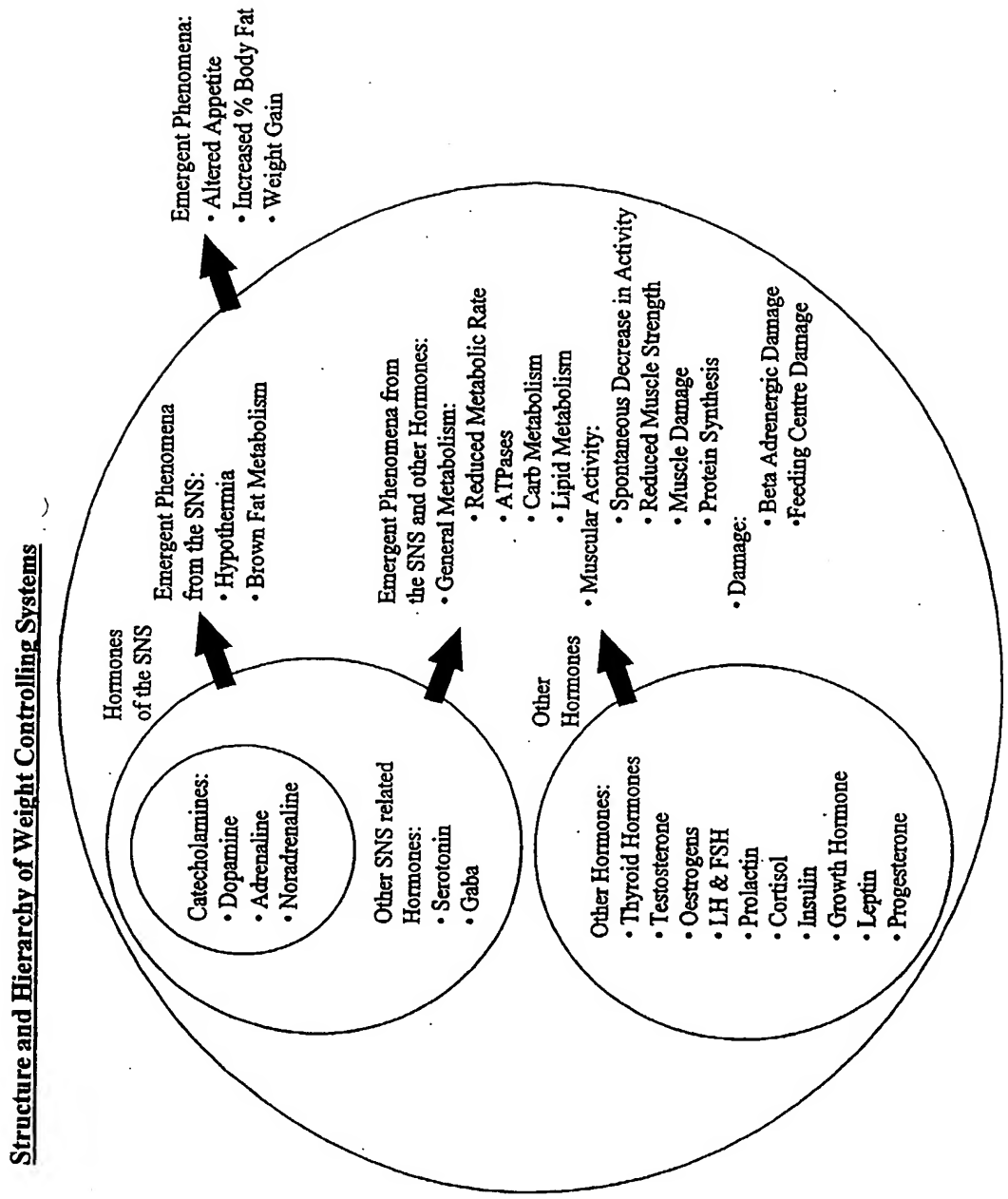

Structure and Hierarchy of Weight Controlling Systems
Hormones of the SNS
Catecholamines:
• Dopamine
• Adrenaline
• Noradrenaline
Other SNS related Hormones:
• Serotonin
• Gaba
Emergent Phenomena from the SNS:
• Hypothermia
• Brown Fat Metabolism
Emergent Phenomena from the SNS and other Hormones:
• General Metabolism:
• Reduced Metabolic Rate
• ATPases
• Carb Metabolism
• Lipid Metabolism
Other Hormones
• Muscular Activity:
• Spontaneous Decrease in Activity
• Reduced Muscle Strength
• Muscle Damage
• Protein Synthesis
• Damage:
• Beta Adrenergic Damage
•Feeding Centre Damage
Other Hormones:
• Thyroid Hormones
• Testosterone
• Oestrogens
• LH & FSH
• Prolactin
• Cortisol
• Insulin
• Growth Hormone
• Leptin
• Progesterone
Emergent Phenomena:
• Altered Appetite
• Increased % Body Fat
• Weight Gain

Figure 8

SLIMMING SYSTEM

TECHNICAL FIELD

The present invention relates to slimming systems, and to methods, processes and compositions for use such systems.

BACKGROUND TO THE INVENTION

Weight control in the body

In most adult individuals body weight is maintained at a relatively stable level for long periods. One theory as to how this is achieved is the so-called "set-point theory" which suggests that body weight is regulated at a predetermined, or preferred, level by a feedback control mechanism. Information from the periphery is carried by an affector to a central controller located in the hypothalamus. The controller integrates and transduces the information into an effector signal that modulates food intake or energy expenditure to correct any deviations in body weight from set-point.

In fact, the likelihood is that the level at which body weight and body fat content are maintained represents the equilibria achieved by regulation of many parameters, rather than one specific parameter related to energy balance (see e.g. Harris, R B S Role of set-point theory in regulation of body weight. FASEB J 4: 3310-3318; 1990). Thus, although body weight or body fat set-point may be related to long-term regulation of energy balance, it has been suggested that this regulation can be achieved only through modulation of short-term responses and sensitivities to factors that influence food intake and energy expenditure. This is generally supported by evidence of the involvement of a large number of factors and physiological systems in the control of food intake and regulation of body weight, including roles for nutrients, dietary composition and organoleptic properties, hormones, neural pathways, various brain nuclei, and many neurotransmitters.

Weight control as an industry

Despite this natural weight controlling system which exists in individuals, the prevalence of obesity in the Western World has increased over the last few decades, tripling to 20% in the UK in the last 20 years, and bringing with it health-related costs in excess of £1.5bn per annum in the UK alone.

The obesity epidemic has spawned a multi-billion dollar weight-control industry selling a broad range of products including diet books, calorie counters, low calorie foods, recipe books, weight loss counselling services, meal-replacements, slimming pills and other products. The many individuals who are not obese in any clinical sense, but who wish to lose or control weight for cosmetic reasons, contribute to the enormous scale of this industry.

For example, one industrial enterprise involved in weight control is Weight Watchers International Inc. which is believed to have over 22,000 employees or franchisees and about a million Members world-wide. Activities at meetings include weigh-ins, nutrition and exercise tips and success stories from others. Appropriately 'kcal counted' products such as breakfast bars, recipes, meal plans and points counters are also sold. Another manifestation of the 'weight control' industry is, for example, discussed in US 5890128 which discloses various devices for assisting weight loss based around computer monitoring of kcal intake and expenditure.

The common thread amongst virtually all of these approaches to weight loss is the concept of the food restriction 'diet'. This was put forward by Drs Johnston and Newburgh in the 1930's at the University of Michigan in the US. Their theory was simple, and well known by most people today. If we consume fewer calories than our body burns then our body will burn up some of its food stores to make up for this energy deficit. This theory has provided the basis for virtually all the hundreds of diet books written since then. But somewhat incredibly, despite the attractiveness of the concept, to date no studies exist to suggest that a simple calorie cutting diet is effective for long-term weight loss at all.

Indeed, virtually the only effective medications on the market for losing weight are amphetamine-like drugs which mimic the actions of one of the sympathetic nervous system (SNS). Their use however involves undesirable side effects and significant risks to the user such as psychiatric disturbances, drug abuse and drug dependency.

Thus it can be seen that there exists a need for technical measures which can provide a rational basis for comparing, and addressing the effects of products which interfere with, or inhibit, weight loss in individuals attempting to achieve it. Such measures, and products adapted to counteract the interference or inhibition, would make it easier for individuals to control their weight, and for professionals to provide appropriate advice to said individuals.

DISCLOSURE OF THE INVENTION

The present inventor has demonstrated that the increased incidence and severity of obesity in the general population can be associated with failure of mechanisms evolved by the body to keep its weight within optimum levels. This failure is being brought on by increasing levels of pollution of all parts of our environment by various chemicals which give rise to damage to these various mechanisms which are discussed in more detail below, and termed herein the body's "Natural Slimming System".

Briefly, such damage is caused *inter alia* by xenobiotic chemicals (e.g. pesticides used in agriculture) entering the food chain, and by exposure to chemicals present in the environment with which we are in contact (e.g. chemicals leaching out from clothing and furnishings of synthetic polymers, plastics utensils, containers etc.). Whilst the amounts of such chemicals are generally relatively microscopic so that their effect is relatively insidious, their cumulative long-term effects may be significant. The correlation between chemical production and % of overweight adults in the population is shown in Fig. 7.

As described herein, any attempt at simple conventional dieting alone may actually worsen the problem since dieting consumes fat and liberates the xenobiotic chemicals stored in the fat and hence

increases the levels of these chemicals in the blood.

Such compounds are already the subject of scrutiny in the art on account of their known toxicity at relatively high levels (e.g. determined in relation to their LD_{50}). However, the principle that such compounds, at the level at which they appear in food and other environmental sources, can have significant (indeed dominant) effects on weight control, has not previously been realized. Thus the weight control industry, and consumers of that industry, previously had no motivation to consider the impact which these compounds have at low (sub-toxic) levels, and in particular the relative effects of the compounds at these levels.

As described herein, once this impact has been recognized, it may be quantified with reference to the various systems in the body which are effected, either directly or via emergent phenomena resulting from damage to the systems. Those skilled in the art will appreciate that this discovery has profound industrially applicable implications for enhancing weight loss in individuals attempting to achieve it.

Indeed, as described in more detail below, it has been found that use of the present invention makes it possible to achieve significantly more effective and long lasting weight reduction without the use of drugs which interfere with the body's natural metabolism, by means of effectively restoring the body's own Natural Slimming System in a substantially natural manner.

Thus the present invention provides systems for use in restoration of the body's Natural Slimming System. More specifically, there are provided herein a variety of technical methods, processes, systems and compositions which can be used to assess, compare, and provide information about the level of damage which may be, or has been, caused by xenobiotics or materials containing them, and also to avoid or counteract such damage.

In order to better understand the present invention, the following provides a general description of some of the features with which it is concerned.

Natural Slimming System

In general terms this is the combination of organs, hormones, organelles etc. which mediate the systems (e.g. sympathetic nervous system, metabolism etc.) and other reactions which are (through various emergent phenomena) responsible for effecting and affecting weight control, and particularly weight loss, in the body.

The Weight Controlling Systems (WCS) of the Natural Slimming System are shown in Figure 8. In general these systems:
(i) actually effect weight loss (e.g. by causing reduced food intake, or increased energy production and usage),
(ii) control these effector systems to maintain an optimal weight, and,
(iii) stimulate the control systems (directly or indirectly) in response to increased weight or fat in the body composition.

For the purposes of the present invention, the most important WCS is the Sympathetic Nervous System (SNS). In every form of known obesity this system is underactive and stimulation of this system causes weight loss. As disclosed herein, the SNS seems particularly susceptible to damage by Xenobiotic chemicals.

Possibly the second most important group of hormones in weight control are the thyroid hormones. These hormones are also severely reduced by a very large number of synthetic xenobiotic chemicals. It can be seen how important these hormones are to the SNS since low levels of thyroid hormones will cause symptoms of an underactive SNS, i.e. weight gain, low body temperature etc.

Other hormones severely disrupted are the sex hormones, oestrogens, progesterone and testosterone, the corticosteroids, insulin and growth hormone. These other hormones also play a major role in controlling weight and chemical damage to these hormone systems tends to greatly enhance weight gain.

Many xenobiotic chemicals, particularly many of the more persistent ones, also appear to directly interfere with some of the millions of reactions taking place in the body which make up our metabolism. If

any of the steps which go towards energy production are damaged, then the whole system can slow up, making it more difficult to convert food into energy. This will reduce the ability to convert food stores into usable energy or heat and so result in increasing fat stores, simply because we cannot burn them up. Xenobiotic chemicals also damage smaller structures such as mitochondria. Damage to these vital organelles which act as body 'power houses', will severely reduce our ability to convert food stores into energy, which also encourages the build up of fat.

Other target WCS are discussed in more detail below under the heading 'Choice of Weight Controlling System'.

Micronutrients

Our bodies are constantly under tremendous pressure to rid themselves of all the toxic xenobiotic chemicals they are constantly being exposed to.

It is believed that micronutrients (vitamins and minerals) and other nutrients such as essential fatty acids and particular amino-acids are required to detoxify and\or excrete xenobiotics and are used up in that process.

Additionally these same micronutrients and nutrients play a crucial role in running our Natural Slimming Systems. Hence their use in counteracting xenobiotics can directly impair our ability to lose weight.

If insufficient of the micronutrients and nutrients are taken in the diet to counteract the xenobiotic chemical load, then they will be unable to participate in these tasks with the result that the Natural Slimming System may be impaired directly and indirectly by xenobiotic accumulation in the body.

Assessing the effects of xenobiotics

The net result of all these adverse effects on the body's Natural Slimming System from these various xenobiotic chemicals is, at one

level, similar to that of consumption of amounts of food which have substantially more kcals (i.e. energetic calories) than those which are being used up by the body in its various activities. It will also be appreciated that certain xenobiotic chemicals are considerably more damaging to the body's Natural Slimming System than others and in order to provide a measure of the relative "toxicity" of different chemicals to the Natural Slimming System and thus the level of their contribution to increase in body fat, a new measurement system has been devised which is called "Chemical Calories". A Chemical Calorie Rating is a measure of the Inhibitory Effect of a toxic chemical on the Natural Slimming System, which Inhibitory Effect will be manifest in the energy balance of the body shifting towards greater weight and fat increase i.e. reduced energy production and\or use for a given energetic calorie intake than would be caused in the absence of the toxic chemical. In this measurement system a xenobiotic chemical which is particularly toxic to the Natural Slimming System will have a high Chemical Calorie Rating, and a less toxic one a lower rating. In this way the effects of different amounts or loadings of xenobiotic chemicals of different toxicity, on the body, can then be compared.

Described herein are various preferred approaches to quantifying the Inhibitory Effect (i.e. severity of damage) to each of the body's WCS or emergent phenomena therefrom.

Particular aspects of the present invention are as follows:

Determination of Chemical Calorie Ratings of xenobiotics

One aspect of the present invention is a method or system for comparing the damaging effects of xenobiotic substances on the Natural Slimming System.

Thus in one aspect, the present invention provides a method for determining the extent of the Inhibitory Effect of a (target) compound on the ability of a (test) subject into whom said compound is introduced to control their weight, which method comprises the steps of (in any appropriate order):

(i) determining the degree to which (or severity with which) the

compound affects each of a plurality of WCS present in the subject; (ii) determining the persistence of the compound in the subject; (iii) calculating the Inhibitory Effect as a function of values of (i) and (ii).

As used in this and other aspects, the term "determination" should not be taken as requiring a precise or direct quantification (although that may be preferred). A value may be estimated by inference from various information sources relevant to the measure in question. Indeed, the values in respect of steps (i) and\or (ii) may be derived from historic (e.g. literary reference) data, and there is no requirement that the assessments are contemporary with the calculation at (iii). Specifically they may be derived from databases of scientific literature, hereinafter referred to as Reports.

In embodiments of the invention, the values in respect of steps (i) and\or (ii) may be assumed, based on results of different compounds containing the same active moiety and\or persistence as appropriate.

Choice of compound

The method may be applied to any compound (organic or inorganic) which it is desired to test, which will generally be one to which subjects may have been, or may come to be, exposed e.g. through ingestion or other uptake from the environment, and which it is believed (for whatever reason) may be damaging to the WCS of the subject.

In the context of the present invention, classes of xenobiotic chemicals which are found to have particularly high Chemical Calorie Ratings, and which it may be desired to assess, are:

(a) Pesticides such as organochlorine insecticides (e.g. DDT and its breakdown products, lindane, etc.); organophosphate insecticides (including the organothiophosphates); carbamates (which include the dithiocarbamate fungicides); and phthalates which are widely used as plasticisers in plastics products, especially PVC products.

(b) Environmental pollutants such as polychlorinated biphenyls, commonly known as PCBs (widespread environmental contaminants); and polybrominated biphenyls, commonly known as PBBs (used as fire retardants in various products).

(c) Solvents such as: chlorinated hydrocarbons (such as trichloroethylene), aromatic hydrocarbons (such as styrene), aliphatic, and alicyclic solvents (such as ethyleneglycol-monobutylether and decalin) which are encountered in a wide range of products such as paint, glue, cleaning fluids etc.

(d) Heavy metals such as cadmium which have become increasingly widely distributed in our everyday environment.

In a preferred embodiment, the effect of metabolites of the compounds in question may also be assessed.

Figure 6 shows some example compounds of relevance which are frequently present in foods or in other environmental sources, and also their effects against certain WCS. Further example compounds of likely relevance can be found e.g. in "The pesticide manual. 11th ED" 1997. Editor C D S Tomlin (Pub. British Crop Protection Council, ISBN 1901396118). Other compounds of relevance may be found in "Chemical Sensitivity Vol 2" (William J Rea, Published by CRC Lewis Publishers).

In preferred embodiments the following compounds are assessed, which have very long half-lives and which are also persistant in the body. These include PCB's, PBB's, organochlorine pesticides, heavy metals as follows:

PCBs:
- 2,4,5,2',3',6'-hexa
- 2,4,5,2',4',6'-hexa
- 2,4,5,2',3',6'-hexa
- 2,3,4,5,2',4',5'-hepta
- 2,3,4,6,2',3',4'-hepta
- 2,3,4,5,3',4',5'-hepta
- 2,3,5,6,3',4',5'-hepta

PBBs: 2,4,5,3',4'-penta
2,4,5,2',4',5'-hexa
2,3,4,2',4',5'-hexa
2,4,5,3',4',5'-hexa
2,3,5,2',4',5',6'-hepta

Organochlorine Pesticides: DDT, DDE, HCB, Oxychlordane, trans-Nonachlor, β-BHC (lindane), Heptachlor epoxide, Dieldrin.

Heavy metals: Lead, Cadmium.

Interestingly compounds in groups such as these (e.g. pesticides) have previously been implicated in weight loss. Thus the disclosure in the present specification that, at low concentrations, they can cause weight gain, is quite unexpected.

In preferred embodiments, in addition to those compounds described above, one, two, three, four, five, six, seven, eight, nine, ten or twenty or more (preferably all) of the following compounds are also assessed:

PCDD (polychlorinated dibenzo-p-dioxins):

TCDD (Tetra PCDD), PeCDD (Pentachloro PCDD), HxCDD (Hexa PCDD), HpCDD (Hepta PCDD), OCDD (Octachloro PCDD).

Phthalates:

Dimethylphthalate, Diethylphthalate, Dibutylphtalate, Butylbenzylphthalate, Di-2-ethylhexylphthalate, Di-Octylphthalate.

Volatile organic compounds:

Chloroform, 1,1,1-Trichloroethane, Styrene, Benzene, Tetrachloroethane, Toluene, Chlorobenzene, Ethylbenzene, 1,4-Dichlorobenzene, Xylene, Ethylphenol.

Carbamates:

aldicarb, carbaryl, chlorpropham, methomyl, pirimicarb, propamocarb, propham, dithiocarbamates.

Organophosphates:

glyphosate, hydrogen phosphide, monocrotophos, tolclofos-methyl, chlorfenvinphos.

Organothiophosphates:

Acephate, azinphos-methyl, chlorpyrifos, chlorpyrifos-methyl, diazinon, dimethoate, ethion, etrimfos, fenitrothion, fenthion, malathion, methamidophos, methidathion, omethoate, parathion, parathion-methyl, phorate, phosalone, phosmet, pirimiphos-methyl, pyrazophos, quinalphos, triazophos.

Choice of Weight Controlling System (WCS)

Preferably the effects on (impairment to) at least 2 or 3 of the following components or manifestations of the Natural Slimming System (see above) are assessed. Preferably the following are assessed:

(a) Hormonal System: hormones may be selected for consideration on the basis of their particular importance to the Natural Slimming System, and an assessment of the significance of damage on each hormonal system by xenobiotic substances can be made. The hormones assessed may be noradrenaline, adrenaline, dopamine, serotonin, GABA, damaged thermoregulation (SNS), brown fat metabolism (SNS), thyroid, male sex hormones mainly testosterone, oestrogens, progesterone, leutinising hormone (LH) and follicle stimulating hormone (FSH), prolactin, cortisol, insulin, growth hormone and leptin.

(b) Metabolism: this broad category includes substances which alter the metabolic rate, in particular substances which reduce the metabolic rate, and substances which damage ATPases (mitochondrial damage), carbohydrate metabolism, and lipid metabolism.

(c) Muscular Activity: this includes substances which: decrease

spontaneous activity; decrease any type of activity; directly damage muscle tissue; and damage protein synthesis.

The effects on these systems may be inferred directly, or indirectly through various emergent phenomena, for example as reflected in: increased food intake, increased percentage of body fat, significant weight gain effects in animals or humans and damage to feeding control centres.

In one preferred embodiment, the Inhibitory Effect on each of the WCS in step (i) is assessed for the various xenobiotic substances, firstly in relation to the objective or subjective degree of damage reported (is scored on a scale of 0 to 10 for each of the key WCS in the listed categories). The Inhibitory Effect is then calculated according to the number of studies showing damage by the substance on the WCS concerned.

Relative importance of different WCS

In preferred embodiments, the Inhibitory Effect on each of the WCS is given a weighting according to the perceived significance of that WCS to the subject's ability to control their weight e.g. a Report demonstrating effect against noradrenaline may be given twice the significance of a Report demonstrating effect against, say, progesterone.

Subjects to whom the invention applies

The subject may be human or animal. The method is particularly concerned with a standardised system which can be used by or for any given subject to compare the likely effect of the compound in question with other compounds. Thus it will be appreciated that in the methods of the invention, the determinations in steps (i) and (ii), and thus the result in (iii) may be based upon effects in one member (or preferably more than one member e.g. a relevant sub-population) of a population of which the subject is representative.

In certain embodiments, the effect on a first (e.g. a human) subject, may be inferred from the degree to which the compound affects each of

a plurality of WCS present in a second (e.g. an animal) subject. In such cases it may be preferred that the method includes the step of weighting the results from the second subject in accordance with its physiological proximity to the first subject.

In one embodiment, this weighting is achieved by factoring on a scale of 1 (non-mammals) to 5 (humans) with e.g. primates (4), other mammals (3) etc. with the resulting figure being divided by the total weighting.

Persistence of the compound in the subject

This may, for example, be considered in relation to the actual half-life of the chemical concerned as such, and more particularly the effective half-life of the chemical compound in the body of the subject taking into account the rate at which the body could itself get rid of the chemical concerned in one way or another.

Half-life may be determined by conventional pharmacokinetic techniques (see e.g. Malcolm Rowland et al. "Clinical Pharmacokinetics" 1980, Lea & Febiger, Philadelphia, U.S.).

In preferred embodiments, from the half-life, a "Longevity Index" is derived which is equal to the half-life in Hours, raised to a power less than one. For example, if the half-life in hours is raised to the power 0.5, the Longevity Index is equal to the square root of the half-life in hours. In alternative embodiments the Longevity Index may be derived in a range of other mathematical or empirical ways such as are well known to those skilled in the art e.g. through empirical clearance or residence times using radiolabelled analogs.

Concentration dependence of compound

Preferably the effect on an average (say 70 kg) human subject is assessed per unit mass of xenobiotic e.g. per mg or µg as appropriate. Where this value can not be derived directly from the study in question e.g. because non-human subjects were used, it can be derived by taking the actual or average concentration used in trials as measured either in mg / kg or in ppm (which are identical).

This in turn can be converted to equivalent human dosage (e.g. by multiplying by an average human weight in kg of 70).

In any case, even in the absence of detailed dosages, it will be appreciated that useful comparative data may still be obtained as described below.

Data quality index

In preferred forms the severity effect determined from a given data source is given a statistical measure of relevance i.e. a confidence level in accordance with a Data Quality Index. For example this may be based on the number of studies or trials available for the compound in question and\or their Proximity to human Trials. Figure 3 shows an example chart.

It will be appreciated that there is a wide range of established statistical techniques that might be used to combine results from a number of different Reports, and a wide range of established statistical techniques for establishing a Data Quality Index or Confidence Level in the data. Such techniques will in general take account of both the number of Reports used and the source of the data (whether human, ape, mammal or vertebrate), and might be either conventional or Bayesian statistical techniques.

Calculation of Inhibitory Effect

The following embodiments, and those set out in more detail in the Examples hereinafter, have been provided as useful methods for permitting the comparison of the Inhibitory Effect of toxic chemical on the Natural Slimming System based on a wide variety of information sources which vary in quantity of chemical assessed, subject used, and the physiological or biochemical system measured. However it will be appreciated that the purpose of the data is to permit informed comparison between the different compounds according to the basic criteria set out above, and hence other methods which permit such comparison also fall within the scope of the present invention.

In one embodiment, the severity of damage to each WCS by a given

xenobiotic is multiplied by a persistence term (e.g. the longevity index) and the totals for all the assessed WCS provide a "Chemical Calorie Rating" for the xenobiotic substance.

Preferably the severity of damage to each WCS is weighted according to a data quality index.

Preferably the severity of damage to each WCS is weighted according to the perceived significance of that WCS to the subject's ability to control their weight.

Preferably the severity of damage to each WCS (corrected or weighted as appropriate) is calculated in units of effect ('Damage Units') against an average human subject/mg compound which may be termed herein "Corrected Severity per Unit Mass".

Hereinafter the result of calculation (iii) may be referred to as "Chemical Calorie Rating" or "Chemical Calorie index value".

As stated above, for practical purposes, groups of different chemicals such as pesticides which have the same principal active functional moiety may be considered to have the same Chemical Calorie Rating - as, for example, in the case of carbamate pesticides. Where, however, different compounds of similar type have substantially different body excretion half-lives, as in the case of organochlorine pesticides, then these may be rated individually.

This approach is analogous to the system with 'conventional' energetic kcal whereby, for example, all proteins are given the same rating (or 'energy factor' of kcal/g) even though their actual values will depend on their particular amino acid sequence (see e.g. UK Food Labelling Regulations (FLR) 1996 (SI 1996 No 1499), which implements the provisions of the EC Nutrition Labelling Directive (90/496/EEC) - especially FLR Schedule 7 Part 1).

The above process is illustrated, by way of non-limiting examples only, on flowcharts 1a and 1b, and Figures 1 to 4.

The Chemical Calorie Rating, and hence the method above, is

especially useful for comparative purposes. Thus (as with 'conventional' energetic kcal) the precise extent of the effect on an individual may vary from subject to subject based on precise health and pharmacokinetic factors. Nevertheless, those skilled in the art will appreciate that the values may still be useful for any given individual e.g. for comparative purposes, and for making rational choices in the devising of weight loss plans and supplements.

Related aspects

In a further aspect, therefore, the invention provides a method for comparing the relative Inhibitory Effects of a plurality of compounds on the ability of a subject to control their weight, which method comprises performing a method as described above, and then comparing the Chemical Calorie Ratings for each compound.

In a further aspect the invention provides a method of producing a database of the Inhibitory Effects of a plurality of compounds on the ability of a subject to control their weight, which method comprises the steps of performing a method as described above, and combining the result of the Chemical Calorie Ratings for each compound into a database.

The database so produced, which has utility in providing a rational system for improving the ability of a subject to control their weight as described below, forms a further aspect of the invention, as does a data carrier comprising, containing, consisting of, or consisting essentially of, said database.

Thus in general terms, as set out in various aspects of the invention below, the Chemical Calorie Rating can be used to quantify the practical significance of the xenobiotic substance in relation to, for example, the existing Chemical Calorie 'loading' in an individual human or the Chemical Calorie 'content' of a given food or other environmental source, by means of multiplying the Chemical Calorie Rating of that substance, by the amount of that substance, in order to obtain the Chemical Calorie loading/content for that particular substance. Finally in order to obtain total Chemical Calorie loading or content, the Chemical Calorie loading/content values for all

significant xenobiotic substances would be added together. From such totals it may then be seen which particular foods should be avoided in order to minimise damage to the Natural Slimming System - bearing in mind that the Chemical Calorie Rating for a given food can vary considerably depending on whether any pesticides were used in its production and if so, which ones, and whether it was produced in a contaminated environment, and if so which pollutants were present. Similarly an individual subject can use his/her Chemical Calorie loading value to determine the degree to which his/her Natural Slimming System may have been compromised and require more or less intensive use of the dietary system of the present invention.

Some practical illustrations of the determination of Chemical Calorie Ratings and their use in determining Chemical Calorie content (e.g. total Inhibitory Effect of compounds in a given food) and loading (e.g. total Inhibitory Effect of compounds in an individual human subject) are provided in the following aspects and Examples.

Methods of determining Chemical Calorie content of item

The following embodiments, and those set out in more detail in the Examples hereinafter, have been provided as useful methods for determining the Chemical Calorie content of an item based on a wide variety of information sources. However, as with the Chemical Calorie Ratings discussed above, other methods which permit the same result also fall within the scope of the present invention.

The starting point for these methods is an analysis of the item in question in order to ascertain which potentially relevant xenobiotics it contains. Generally speaking, such analysis may be literature based (e.g. using publications by Government organizations relating to food compositions, such as those from MAFF in the UK), experience based (e.g. higher likelihood of finding a given pesticide in produce known to derive from a region from in which the pesticide is used), or based on direct determination of chemical content using appropriate analytical techniques (this final source, although potentially the 'gold-standard' assessment, may be less preferred for cost considerations).

This multi-source approach to defining the content of foods is analogous with existing approaches taken for nutrition labeling (see especially FLR *supra* Schedule 7 Part I).

Thus in a further aspect of the present invention there is provided a method for determining the Inhibitory Effect of an item on the ability of a subject exposed to said item to control their weight, which method comprises at least the step of: (i) determining the amount, if present, of each of a plurality of compounds in the item, which compounds have an Inhibitory Effect on the ability of a subject to control their weight.

In preferred embodiments, the method will comprise one, two, three, or four of the following further, optional steps (in any appropriate order):

(ii) determining Chemical Calorie Rating for each compound as described above,
(iii) determining the degree to which exposure of the subject to the item will result in introduction into the subject of each of said plurality of compounds in the item,
(iv) calculating the Inhibitory Effect of the item as a function of values of (i)-(iii).

Nature of and range of items and compounds analysed

In preferred embodiments, prior to step (i) the item is categorised into pre-determined elements based on the nature of the compounds which may be expected to be present in each element.

For example primary categories may be foodstuff vs. non-food (note food as used herein includes also drink). Non-food items may include fat or blood biopsy sample; skin-care product; air sample; item of furniture; material for food packaging. Blood and fat biopsy samples are discussed hereinafter

Subsidiary categories within foodstuff may be:

Foodstuff into integral packaging and food itself.

Food into ingestable and non-ingestable portions (e.g. the latter may be fruit peel).
Ingestable material into sub-types (e.g. a supermarket ready meal may comprise a portion of rice and a portion of sauce).

Once the item has been maximally categorised into elements, for efficiency and convenience, it may be preferred that the different elements can be an analysed only for those compounds which are likely to be present (which likelihood is determined e.g. from a look-up table based on historical analyses). Certain elements may be ignored on the same basis (e.g. non-ingestable food portions).

Put another way, the category of element may be used to determine which of the plurality of compounds are investigated. Likewise it may be convenient to group the compounds which may be analysed into categories for this purpose e.g. organic and inorganic etc.

Likewise, the sensitivity of the determination may be tailored (up to a maximum sensitivity available through analysis) according to the Chemical Calorie Rating of the xenobiotic in question i.e. it may be desirable for cost or time considerations to test only for relatively high levels of xenobiotics having a relatively low rating, while more sensitive testing can be reserved for highly toxic compounds. In this way useful comparisons between items may still be made with reduced effort.

In any case it may be preferable that only compounds having Chemical Calorie Rating greater than a predefined minimum value are assessed.

Chemical Calorie Rating of xenobiotics identified

Once the xenobiotics present in the item have been identified, the next step is to determine their Chemical Calorie Rating.

This will be determined as set out in earlier aspects of the invention. Preferably the rating will be obtained from historical data e.g. from a table or other database as described above.

Exposure and uptake

This step is relevant since the level to which compounds in the item are actually introduced into the subject will of course depend on the nature of the item and elements thereof.

Thus for food elements it may depend on ingestion and absorption factors.

For foodstuff packaging it may depend on to what level the compound is absorbed into the food (e.g. during cooking) and\or direct absorption appropriate to the use of the foodstuff. For example, packaging for food may transfer its chemicals into a foodstuff according to the way it is used. Thus its impact is most readily assessed by analysing the foodstuff so treated for additional Chemical Calories and from this the Chemical Calorie content and absorption rate of the chemicals by the foodstuff can be determined.

For non-food items it may depend on direct absorption appropriate to use. In principle, items which release compounds having high Chemical Calorie ratings by being part of the general environment (rather than being ingested) may be made entirely from Toxic Chemicals, so their Concentration (mg / kg) may be as high as 100%. However the absorption rate of these Chemicals will generally be very low.

Where the item is a gaseous environmental samples (e.g. of household air) the xenobiotic may be measured e.g. as ppm using conventional techniques (e.g. vortices used in gas analyses, such as may be used in NBC defense systems).

Calculation of Inhibitory Effect of item

Preferably the function in step (iv) will be based on (i) (e.g. in mg/kg) multiplied by (ii) (e.g. expressed as DU/mg) factored by (iii) (e.g. expressed as % absorption). This will give a value of the Chemical Calories which may be absorbed from a given quantity of the item by e.g. a human subject. Thus the value given by this function will represent the total Inhibitory Effect of compounds in a given

item i.e. an 'effective Chemical Calorie content'. Preferably, in the case of foods, the Chemical Calorie content is declared for 100g or 100 ml of the food and\or a typical portion.

In some cases, the levels of Toxic Chemicals in the Item may be so high that they might cause weight Loss, or other more serious toxic effects. In such cases, the level of Chemical Calories in the Item becomes meaningless and it is appropriate simply to report that the Item is Toxic and not to report the number of Chemical Calories that it contains.

The above process is illustrated, by way of non-limiting examples only, on flowcharts 2a, 2b and 3.

Related aspects

A further aspect provides a method of producing a database of the Inhibitory Effects of a plurality of items on the ability of a subject exposed to said items to control their weight, which method comprises the steps of performing a method as described above, and the combining the values or results thus obtained into a database.

A database so produced, and data carrier carrying said database form further aspects of the present invention.

Also provided is a computer system for performing the methods as described above, or displaying the output of said methods or the databases and\or data carriers of the invention. Such a system may be essentially conventional in that it comprises (a) a standard electronic computer circuit containing at least a random access memory, a read only memory, a processor; (b) a keyboard comprising a plurality of standard keyboard buttons (c) a display. Systems for storing and\or displaying of the energetic (kcal) content of items are discussed in US Pat. Nos. 4,244,020; 4,321,674; 4,575,804; 4,686,624; 4,796,182; 4,894,793; 4,380,802 and 5,233,520. The computer systems of the invention are analogous to these except that they concern Chemical Calories instead of, or in addition to, kcal.

Banding and labelling

In one further aspect, the present invention provides a method for comparing the relative Inhibitory Effects of a plurality of items on the ability of a subject exposed to said items to control their weight, which method comprises the steps of performing a method as described above to yield a value for the effective Chemical Calorie content for each item, and then comparing these values.

Alternatively, it may be sufficient to ensure that the effective Chemical Calorie content for a given item does not exceed a maximum threshold. Thus the methods of the present invention may be used irrespective of whether the objective is to identify the absolute level of Chemical Calories in the Item, and to identify which xenobiotics are responsible, or merely to ascertain whether the item can be accepted as "low in Chemical Calories" or "very low in Chemical Calories".

To ascertain whether an item can be certified "low in Chemical Calories", a preferred approach will be to try to reject the Item as quickly as possible to reduce analytical costs and time taken. Once the tester is satisfied that all likely sources of Chemical Calories have been checked, and the relevant xenobiotics are either absent or below some predetermined limit, the product be certified accordingly.

Optionally the method may include the further step of categorising or banding said values (and hence said items) based on a pre-determined scale of values as follows:

Very low
Low
Medium
High
Very high

As described in various embodiments and aspects herein, such a system may be of genuine technical importance to potential manufacturers, sellers, purchasers and\or users of the items in question.

A further aspect provides a system for labelling and\or certifying an item according to its Inhibitory Effect on the ability of a subject exposed to said item to control their weight, which method comprises the steps of performing a method as described above such as to yield a value (optionally a null value) for the effective Chemical Calorie content for the item (and optionally categorising or banding it) and then further comprising the step of labelling and\or certifying an item according to value, category, or banding.

The labelling and\or certifying may be performed by means of incorporating the effective Chemical Calorie content information into the item, its packaging, or into ancillary materials associated therewith.

Therefore, in one embodiment there is provided a process for producing a labelled \ certified item in accordance with the above, which process comprises:
(i) providing an item to be labelled \certified,
(ii) analysing said item as described above,
(ii) labelling and\or certifying the item as described above.

In a variant of this embodiments, step (ii) is performed not on the item to be certified as such, but on a representative or equivalent item e.g. a representative sample from a batch.

Thus, as described above, in various aspects of the invention there are described methods for determining the Chemical Calorie content of a foodstuff which comprise the steps of: determining the amount of xenobiotic substances in the foodstuff (e.g. which xenobiotic substances have a Chemical Calorie Rating above a predetermined level); calculating the Chemical Calorie content from each said substance by multiplying its Chemical Calorie Rating by the amount present; and adding together the Chemical Calorie contents for all said substances. Conveniently the method includes the preliminary step of determining the Chemical Calorie Rating for each said xenobiotic substance by means of the preliminary steps of: scoring said xenobiotic substance for severity of adverse effect on each of a plurality of WCS; summing the scores for said plurality of WCS; and multiplying the sum of said scores by an indication of the effective

half-life of said substance and any harmful metabolites. The results of the methods may be used for the purposes of comparison, databases, labelling etc.

Determining the Chemical Calorie loading of a subject

The above aspects of the invention have been particularly concerned with the Chemical Calorie Rating or content of compounds or items which are commodities. However the work of the present inventor has demonstrated the significance not just of these measures, but also of the pre-existing Chemical Calorie loading in individuals who wish to effectively and efficiently control their weight (which will generally be to lose weight i.e. 'slim'). Thus such control will be dependent not just on the Chemical Calories to which the individual becomes exposed during the e.g. slimming process, but also on the extent to which the subject has already had their ability to control their weight inhibited by pre-existing Chemical Calorie loading.

Accordingly, in a further aspect, the present invention provides a method for determining the extent to which a subject has had their ability to control their weight inhibited, which method comprises the steps of: (i) determining the amount, if present, of each of a plurality of compounds in the subject, which compounds have an Inhibitory Effect on the ability of a subject to control their weight. Preferably the method will further include the optional steps of:
(ii) determining Chemical Calorie Rating for each compound as described above,
(iii) calculating the total Inhibitory Effect as a function of values of (i) & (ii).

In preferred embodiments, the value for step (i) will be based on a sample removed from the subject e.g. a fat biopsy. The xenobiotic chemicals responsible for the Chemical Calorie loading tend to accumulate preferentially in the fat deposits in the human body and thus the concentrations of these in the fat deposits generally provide the most reliable indication of the Chemical Calorie loading already in the body. Accordingly measurements of xenobiotic concentrations in the fat samples obtained from suitable biopsies or

in the course of medical or cosmetic procedures involving recovery of fat deposits, such as liposuction, are most useful in this connection. It will be appreciated though that less invasive procedures may be preferred in some cases, thus some indication of xenobiotic concentrations and hence Chemical Calorie loadings in the body can also be obtained by means of analysing blood samples, albeit the xenobiotic concentrations will be very much lower in blood than in fat deposits and thus more difficult to measure, and also less representative of actual concentrations in the particularly significant accumulations in the fat deposits, and hence less reliable.

As above, the Chemical Calorie Ratings will generally be historical values.

The function at (iii) may be (i) multiplied by (ii).

The method may further include assessing one or more other factors which may be relevant to the extent to which the subject has had their ability to control their weight inhibited e.g. based on other personal factors such as susceptibility to damage (e.g. age, weight, disease state etc.) and also personal pharmacokinetic factors e.g. based on rates of clearance of the compounds.

Accordingly, in a further aspect, the present invention provides a method of diagnosis and\or prognosis of weight-control related disorder or disease in a subject, which method comprises performing a method as described above, and correlating the result of the determination at step (iii) with the disease state of the subject.

In a yet further aspect, the present invention also provides a method of determining an individual's progress in altering (and especially reducing) the extent to which their ability to control their weight has been inhibited which method comprises repeatedly performing a method of determining said extent (as described above) at intervals, and comparing the results of the determination to establish the progress made. Such a method is particularly useful in conjunction with, and to assess the success of, the methods given below for reducing Chemical Calorie loading.

Slimming Systems

It will be appreciated from the foregoing that a heavy Chemical Calorie loading in an individual can lead to weight-control related disorders.

In a further aspect, the present invention provides a system for improving or maintaining the ability of a subject (e.g. a human or non-human mammal) to control their weight, which method comprises the steps of prescribing to said person:
(a) a dietary plan of foods, the Inhibitory Effect of which on the ability of a subject exposed to said foods to control their weight has been established as described above i.e. said foods are categorised according to their Chemical Calorie content and\or the individual ratings of the Chemical Calorie providing compounds therein,
(b) a dietary plan of supplements, which either: reduce or negate the Chemical Calories loading, or counteract the effect of chemical calories in the Natural Slimming System, and
(c) optionally advice in relation to non-food items, the Inhibitory Effect of which on the ability of a subject exposed to said items to control their weight has been established according to the method described above.

Some specific preferred dietary plans of foods and supplements are described hereinafter.

Clearly, for individuals wishing to lose weight, the dietary plan of foods in the above prescription will be made in conjunction with a low (energetic) kcal diet (say 1800-2000 kcal for a woman, and 2500-3000 kcal for a man) and so on.

In general the above prescriptions will be made in conjunction with one or more of the following:
(d) an exercise plan,
(e) advice in relation to other lifestyle factors which may be assessed as part of the method.

For example, in relation to (d), and as with other previously known effective slimming systems, the benefits can be enhanced by prescribing a sensible exercise programme. The particular benefits of combining suitable exercise with the methods and dietary system of the present invention include mobilisation of xenobiotics from the body's fat stores and/or vital organs into the blood stream whereupon they may then be removed from the body by means of Chemical Calorie absorbents; facilitating excretion of xenobiotics circulating in the blood and lymph in the form of sweat and sebum, through pores in the skin; as well as reducing the size of the fat stores in which xenobiotics can be held in the body. Exercise also helps to restore and rebalance many of those hormones which are damaged by xenobiotic chemicals and which also play a vital role in the Natural Slimming System. In more detail, exercise tends to increase the level of testosterone, dehydropiandrosterone sulfate (DHEAS), thyroxine, and most importantly catecholamines, all of which are vital in promoting weight loss. Exercise also tends to reduce the level of hormones which promote weight gain such as cortisol and insulin.

Preferably the system will comprise the further step of determining the extent to which a subject has had their ability to control their weight inhibited, by use of a method for determining their Chemical Calorie loading as described above. This extent may preferably be determined prior to, during, and\or after the period over which the dietary plan extends. The Chemical Calorie loading may be used to establish levels and types of foods and supplements appropriate to the individual and their weight control impairment. Progress (lowering of Chemical Calorie loading) can thus be accurately assessed.

Clearly monitoring of Chemical Calorie loading may be done in conjunction with other measures of progress e.g. weight loss, fitness improvement (e.g. based conventional criteria such as heart response etc.), and other health assessments.

In a further aspect of the present invention there is provided a method of producing a tailored advice plan for a subject, which plan provides a system for improving or maintaining the ability of the subject to control their weight, in accordance with a method

described above.

Dieting methods

In a related aspect there is provided a method of controlling the weight of a subject, which method comprises the steps of the subject following: (a) a dietary plan of foods, (b) a dietary plan of supplements, and (c) optionally advice in relation to non-food items, in each case as described above.

Clearly, in following the dietary plans, the foods and supplements will be orally administered to or by the individual. Generally the plan will be followed until a beneficial loss of body weight has occurred, and beyond (on a maintenance basis).

Different dietary methods and subjects

Certain subjects may use the reductions in Chemical Calories and supplements as listed, the types of food as listed but not the calorie restriction diet part (e.g. breast-feeding mothers).

Certain subjects may use the reductions in Chemical Calories but not the supplements as listed (as they will require different doses) the types of foods listed but not the calorie restriction diet part (e.g. pregnant subjects).

Certain subjects should use the reduction in Chemical Calories and supplements, the foods suggested with the calorie restriction part being optional (e.g. sportsmen).

Other subjects are free to use all parts of the programme (e.g. those who are overweight, or are trying to actively lose weight for other reasons).

For those dieters who are obese, a further valuable and important benefit of the present invention is that not only does it lead to reductions in excess bodyweight, but it also helps control and treat various conditions associated with obesity such as immune dysfunction, autoimmunity, cardiovascular disorders, pulmonary

disorders (for example asthma), allergies, cancers, mood changes, neurological illnesses, changes in libido, hormonal disorders, reproductive dysfunction, congenital abnormalities, metabolic disorders (for example glucose dysregulation), muscular skeletal disorders, renal and genitourinary disorders and skin disorders.

The diet may be for the purpose of cosmetic improvement i.e. the dieter may not need or wish to lose weight for health reasons (e.g. obesity). In such individuals there would be no inevitable therapeutic effect. Thus, for such individuals, the invention particularly provides a method of improving their appearance.

Thus the invention provides a method of controlling one's weight via restoration of the body's natural slimming control system, which method is effected through a dietary system comprising at least one of: substantially reducing exposure to environmental Chemical Calories; a low Chemical Calorie content diet; removal of Chemical Calories from the body by means of ingestion of an absorbent for xenobiotic substances with high Chemical Calorie Ratings; use of a micronutrient supplement containing an effective amount of Chemical Calorie removing micronutrients; use of a micronutrient supplement containing an effective amount of Chemical Calorie depleted micronutrient components to repair and reinforce the natural slimming control system. A preferred slimming method will comprise: reducing the Chemical Calorie loading of the body; reducing Chemical Calorie ingestion and absorption from the environment; increasing ingestion of Chemical Calorie load-reducing micro-nutrients; and increasing ingestion of key Natural Slimming System component micronutrients.

Preferred diet of foods at (a)

As noted above the Chemical Calorie Rating varies significantly from one xenobiotic chemical to another. Thus, for example, in relation to pesticides, chemicals such as methalaxyl, bromopropylate, and procymidone have relatively low ratings, whereas others such as dichlofluamid, carbendazim, thiabendazole, and aldicarb have ratings which are some 20 to 100 times higher.

In general it has been found that xenobiotic chemicals having a

Chemical Calorie Rating which are very low are not a significant problem in relation to slimming. On the other hand xenobiotic chemicals such as certain PCBs are particularly serious, and require especial consideration in relation to avoidance of ingestion and/or exposure to, and in relation to removal from the body and inclusion of micronutrients in supplements for encouraging removal thereof and correcting depletions resulting from consumption of micro-nutrients as a result of their presence. Micro-nutrients are discussed in more detail hereinafter.

Of course the overall fattening effect of the xenobiotic chemicals will also depend on the actual concentrations thereof present, which will determine the overall Chemical Calorie loadings present in the diet and in the body. The Chemical Calorie loadings present in food will depend very much on the conditions in which the food has been produced. Thus for example rabbits raised in some countries tend to have relatively high Chemical Calorie loadings due to contamination of their feed with significant concentrations of chemicals with high Chemical Calorie Ratings, whereas those raised in the United Kingdom have no significant Chemical Calorie loading. Accordingly UK rabbit meat would generally be suitable for inclusion in a low Chemical Calorie diet but not rabbit meat from the former countries.

Preferred diet of supplements at (b)

The counteracting supplements at (b) described above will generally be micronutrients or absorbants which reduce or remove Chemical Calorie loading; or micronutrients which counteract the effect of Chemical Calories on the WCS of the Natural Slimming System.

The amount of micronutrients required to restore and/or maintain effective functioning of the body's Natural Slimming System will depend on various different factors such as the quantitative and qualitative nature of the Chemical Calorie loading in the body, as well as the exposure of the body to xenobiotic chemicals in the

actual diet and/or in the actual environment.

In more detail these requirements will depend on the body's requirement for micronutrients which are active in removal of the prejudicial xenobiotic chemicals contributing to the Chemical Calorie loading; the body's requirement for micronutrients which are active in preventing damage to the Natural Slimming System and the body's requirement for micronutrients having a significant role in the effective functioning of the Natural Slimming System and which have been significantly depleted in one way or another by the Chemical Calorie loading.

In general though, the most important micro-nutrients for effective functioning of the Natural Slimming System are Vitamins A, B1 (Thiamine), B2 (Riboflavin), B6 (Pyridoxine); co-enzyme Q10, magnesium and zinc. The most important micronutrients for protecting the body against damage to the Natural Slimming System generally speaking are: Vitamins A, C, and E and zinc. The most important micro-nutrients active in removal of the prejudicial xenobiotics are, in general: Vitamins B3, B5 (Pantothenic Acid) B6, B12, C and E, choline, folic acid, magnesium, zinc and iron. It will of course be appreciated that the human metabolism is highly complex and involves many different reactions and processes utilising many different enzymes, reactants etc. Thus many other micro-nutrients having utility in one or more of the above roles could also be beneficially included in the system and methods of the present invention.

It will also be appreciated that individual requirements for such micro-nutrients will depend on a number of factors including *inter alia* their individual exposures to xenobiotics, individual susceptibility to damage thereby, individual efficiency in excretion thereof etc. In general though suitable dosage rates for the above-mentioned micro-nutrients for a typical individual having an average western diet and exposure would be within the following ranges:

Micronutrient	**Preferred minimum dose**	**Desirable Minimum dose**	**Preferred Upper limit**
Vitamin A	3,000 IU	10,000 IU	25,000 IU
Vitamin B1	10 mg	50 mg	500 mg

Vitamin B2	10 mg	50 mg	300 mg
Vitamin B3	20 mg	50 mg	400mg
Vitamin B5	20 mg	50 mg	1,000 mg
Vitamin B6	20 mg	100 mg	500 mg
Vitamin B12	20 mcg	100 mcg	1,000 mcg
Folic acid	200 mcg	400 mcg	1,000 mcg
Choline	100 mg	300 mg	1,000 mg
Vitamin C	500 mg	3,000 mg	20,000 mg
Vitamin E	100 IU	400 IU	1,400 IU
Co-enzyme Q10	20 mg	40 mg	1,000mg
Magnesium	200 mg	400 mg	2,000 mg
Zinc	10 mg	20 mg	200 mg
Iron	5 mg	20 mg	200 mg

In the case of individuals having a heavy loading and exposure, the recommended dosages would be increased by of the order of at least 100%. Also, in the case of individuals who are on a slimming (i.e. reduced kcal) diet, the recommended dosages should also be increased by the order of at least 100%.

In general no adverse effects would be experienced with substantially higher dosages of the above key micronutrients although in general no significant additional benefit is obtained by increasing the dosages above the desirable minimum level by more than 300%. Conveniently therefore the micronutrient supplements contain from 100% to 600%, preferably from 100% to 300%, of the above indicated minimum dosage levels. It will nevertheless be appreciated that some specific departures from the above generality may be appropriate in relation to certain micronutrients. Thus in the case of choline other benefits such as enhanced detoxification may be obtained with dosage levels of up to 1000% of the recommended minimum dosage. On the other hand in the case of folic acid the use of dosage levels greater than 500% of the minimum may result in undesirable side effects such as potentially masking a vitamin B12 deficiency causing irreversible nerve damage. Various other micronutrients may also be included in the supplements of the present invention, in order further to enhance the beneficial effects thereof. In this connection, the following micronutrients may be mentioned, biotin, bethaine, inositol, vitamin D, lipoic acid, phosphatidyl choline, calcium, organic sulphur,

copper, chromium, selenium, manganese, vanadium, molybdenum, iodine, boron, PABA (para-aminobenzoic acid), vitamin K and silicon.

It should be noted that the above recommended doses are generally based on an adult bodyweight of the order of 70 kg, and could, if desired, be adjusted *pro rata* for significantly different bodyweights. Obesity is of course also an increasing problem amongst children and the slimming system of the invention is equally applicable to children. Again suitable doses would be based *pro rata* on the above indicated doses. Conveniently a child dose would generally be 50% of the above indicated adult doses. Use of the slimming system would in general though not be recommended for children below the age of 5 years.

It should also be noted that at least some micro-nutrients can be conveniently presented in a so-called "food form" in which they are bound up with various different food components such as yeasts, citrus pulp, vegetable oil and carrot concentrates, in order to make them more recognisable to the body. This acts to significantly increase their absorption and availability, cutting down on the total amount of micronutrient needed to achieve the same task. In one example of such a presentation co-enzyme Q 10, is mixed into a culture of *Saccharomyces cerevisiae* to which it forms natural organic bonds. With this presentation 30 mg of the "food form" co-enzyme Q10, is equivalent to some 257 mg of conventional co-enzyme Q10 preparations. The advantage of such "food form" presentations is the substantial reduction in micronutrient dosage needed to achieve the same effect. Accordingly it should be understood that any micronutrient dosages indicated herein are based on conventional forms of presentation unless otherwise indicated and encompass dosages of "food form" (and other types) presentations which have functionally equivalent effects in the human body.

In addition certain other substances such as one or more of: amino acids, essential fatty acids, phytonutrients, herbal detoxification remedies, hormone balancing herbs, alkalising substances and enzymes may be beneficially included in a dietary supplement of the present invention. Particularly suitable substances for inclusion in a dietary supplement of the invention comprise:

Substances promoting effective functioning of the Natural Slimming System:

Tryptophan (or L-5 hydroxytryptophan if preferred)
tyrosine, and
essential fatty acids especially omega-3 fatty acids, for example linseed oil.

Substances which protect against xenobiotic induced damage to the Natural Slimming System

Anthocyanidins (a sub-group of flavinoids)

Substances which enhance the detoxification process

Methionine (amino acid)
Cysteine (amino acid)
Taurine (amino acid)
Glutathione (amino acid)
Essential fatty acids especially omega-3 fatty acids, for example linseed oil.

Suitable daily doses for these supplements are as follows:

	Preferred minimum dose	**Desirable Minimum dose**	**Preferred Limit**
Non-citrus Anthocyanidin complex (bilberry extract)	20 mg	25 mg	1000 mg
Tryptophan or L-5	50 mg	200 mg	4000 mg
Hydroxytryptophan	50 mg	100 mg	300 mg
Tyrosine	200 mg	500 mg	3000 mg
Methionine	100 mg	500 mg	3000 mg
Cysteine	100 mg	500 mg	4000 mg
Taurine	100 mg	300 mg	4000 mg

Glutathione	150 mg	500 mg	4000 mg
Omega-3 fatty acids(from linseed oil)	4 g	20 g	150 g

Various other micronutrients may also be included in the supplements of the present invention, in order further to enhance the beneficial effects thereof. In this connection, the following micronutrients may be mentioned:

Amino acids: isoleucine, leucine, valine, lysine, phenylalanine, threonine, ethanolamine, glycine, serine, glutamine (or glutamic acid), aspartic acid, arginine, histidine, alpha-ketoglutaric acid, alanine, asparagine, proline, carnitine, butyric acid, butyrates;

Essential fatty acids: omega-6 (and omega-3) essential fatty acids (from primrose, blackcurrant, borage, safflower, canola, soyabeans, sesame, sunflower, olive oil, walnut, or pumpkin);

Phytonutrients: bioflavonoids, curcumin, catechins, lycopene, lutein, zeanxanthin, allium compounds, capsaicin, coumarins, chlorophyll, ellagic acid, sulphoraphane, isothiocyanate, anthocyanins, proanthocyanins, phenolic acids, quercitin, monoterpenes, liminoids, terepenes, indoles, allyl sulphides, carotenoids, saponins;
Herbal detoxification remedies: milk thistle, burdock, red clover, fenugreek, echinacea, yellow dock, dandelion root, ginkgo biloba, blessed thistle, ginger root, sarsaparilla root, plantain leaf, saw palmetto berry, corn silk, fructo-oligosaccharides, garcinia cambogia, oligosaccharides, flax meal, elecampane root, schisandra berry, elderberry, cloves, cat's claw, black walnut hull, goldenseal root, barley bran, wheat bran, tumeric, aloe vera, hibiscus, echinacea, fenugreek, dong quai, astragalus root, micro algae, melatonin, pinus maritima, kelp, slippery elm, sorrel, marshmallow root, fennel seed, barberry rootbark, senna, curacao, cascara sagrada, green tea, African bird pepper, cayenne and probiotics;

Hormone balancing herbs: licorice root, ginseng, isoflavones,

genistein, chaste tree berry, triphala, black cohosh, wild yam, saw palmetto, damiana;

Alkalising minerals: potassium bicarbonate, sodium bicarbonate, calcium carbonate or magnesium carbonate:
Enzymes: lipase, protease, amylase, phytase, trypsin, chymotrypsin, lactase, catalase, superoxidase dismutase and glutathione peroxidase.

Preferred supplements will include at least methionine and glutathione, preferably in conjunction with tyrosine and tryptophan, and optionally one or more additional components discussed above e.g. omega-3 fatty acids.

Other preferred additional components include anthocynanidins, cysteine, and taurine.

In order to maximise the effective functioning of enzyme systems in the body which are involved in removal of damaging xenobiotic substances, the dietary system of the inventions desirably also includes an alkalisation supplement to adjust the pH balance in the body. Conveniently this is in the form of a physiologically acceptable weak base such as one or more of sodium bicarbonate, potassium bicarbonate, calcium carbonate, magnesium carbonate etc with a typical dosage of around 5 g total of the bases included, taken up to 4 times a day. The need for using an alkalisation agent will of course vary from one individual to another and can readily be determined by, for example, testing the pH of the urine with a pH indicator strip or the like. In those individuals where the urine is found to be significantly acidic then a suitable dosage range would generally be in the range of from 50 to 200 millimoles of monovalent weak physiologically acceptable base such as $NaHCO_3$ or $KHCO_3$ or an equivalent amount of multivalent weak physiologically acceptable base such as $CaCO_3$ or $MgCO_3$, per day - conveniently taken in 3 or 4 doses throughout the day. Of course mixtures may also be used.

Advantageously also there may be included an enzyme supplement containing one or more digestive enzymes to enhance the functioning of the Natural Slimming System and/or protect it from damage by xenobiotic substances and one or more detoxification enzymes which

are active in removing xenobiotic substances from the body. Suitable digestive enzymes which may be mentioned include lipase, protease, amylase, trypsin, chymotrypsin, and lactase; and suitable detoxification enzymes include catalase, superoxidase dismutase, and glutathione peroxidase.

Formulations of supplements

It will of course be appreciated that the various supplements, micronutrients etc used in the slimming system may all be presented in any type of formulation known in the art, and the present invention encompasses the use of all such formulations and presentations. Suitable kinds of formulations that may be used if desired, which may be mentioned here include oral and topical, as well as rectal and parenteral where appropriate.

The formulations may conveniently be presented in unit dosage form and may be prepared by any of the methods well known in the art of pharmacy. All methods include a step of bringing the active compound into association with a carrier which constitutes one or more accessory ingredient. In general, the formulations are prepared by uniformly and intimately bringing the active compound into association with a liquid carrier or a finely divided solid carrier or both and then, if necessary, shaping the product into desired formulations.

Formulations of the present invention suitable for oral administration may be presented as discrete units as capsules, cachets, tablets or lozenges, each containing a predetermined amount of the active compound; as a powder or granules; or a solution or suspension in an aqueous or non-aqueous liquid such as a syrup, an elixir, an emulsion or a draught. Other kinds of formulations such as teas or infusions, may also be used. A tablet may be made by compression or moulding, optionally with one or more accessory ingredients. Compressed tablets may be prepared by compressing in a suitable machine the active compound in a free-flowing form such as a powder or granules, optionally mixed with a binder, lubricant, inert diluent, surface active or dispersing agent. Moulded tablets may be made by moulding in a suitable machine a mixture of the powdered

active compound with any suitable carrier.

A syrup may be made by adding the active compound to a concentrated, aqueous solution of a sugar, for example sucrose, to which may also be added any accessory ingredients. Such accessory ingredient(s) may include flavorings, an agent to retard crystallization of the sugar or an agent to increase the solubility of any other ingredients, such as a polyhydric alcohol for example glycerol or sorbitol.

As noted hereinbefore, at least some components of the slimming system of the present invention can conveniently be presented in a "food form" combined with food components, for oral ingestion.

Suitable topical formulations include patches.

Formulations for rectal administration may be presented as a suppository with a conventional carrier such as cocoa butter.

Formulations suitable for parenteral administration conveniently comprise a sterile aqueous preparation of the active compound which is preferably isotonic with the blood of the recipient. Useful formulations also comprise concentrated solutions or solids containing an active component of the present invention which upon dilution with an appropriate solvent give a solution for parenteral administration as above.

Chemical Calorie absorbent compositions

In another aspect the present invention provides a slimming composition, in the form of a Chemical Calorie absorbent composition. Such a composition will preferably include charcoal (preferably activated charcoal) and soluble fibre, and desirably also clay. Advantageously there could be included one or more other absorbents selected from:

1. Ion exchange resins (for example colestipol and cholestyramine)
2. Mineral oils
3. Sucrose polyesters (which are non-absorbable lipophilic binding agents)

4. Chelating agents (for example sodium dimercaptopropane sulphonate [DMPS], and sodium dimercaptosuccinate [DMS])
5. Squalene and squalane (found in olive oil).
6. Chitin and other poliglusams (e.g. from crab shell).

It will be appreciated that the amounts of the above mentioned key components will depend on the qualitative and quantitative nature of the individual's Chemical Calorie loading. In general though for a typical individual having an average exposure and diet, the recommended daily dosages would be of the following order:

Absorbent	**Preferred minimum dosage**	**Desirable minimum dosage**	**Preferred upper limit**
Activated charcoal	500 mg	2 g	20 g
Soluble fibre (e.g. pectin)	1 g	3 g	30 g
Clay (e.g. bentonite)	1 g	5 g	30 g

In the case of individuals having a heavy loading and exposure, the recommended dosages would be increased by of the order of at least 100%. Also, in the case of individuals who are on a slimming diet, the recommended dosages should also be increased by of the order of at least 100%.

It will be appreciated that various kinds of clays and soluble fibre materials may be used in the absorbent slimming compositions and methods of the invention. Suitable clays include bentonite, kaolin, and Fuller's earth. Suitable soluble fibre materials include psyllium, locust bean gum, oat bran and/or oat gum, konjac mannan, pectin, guar gum, acacia gum, rice bran.

Use of supplements

Further aspects of the present invention provide a Chemical Calorie counteracting supplement for use in the systems and methods above.

Also provided is a method of treatment for a subject suffering from obesity, or a method of improving the bodily appearance of a subject, which method comprises administering a formulation as described herein to the subject. Likewise the supplement for use in these methods is also provided, as is use of the supplement in the preparation of a medicament for these methods.

Systems

Thus the invention also provides a system for improving or maintaining the ability of a subject to control their weight, which system includes:
(a) a commodity provider, who provides commodities for the subject,
(b) a certifier who certifies said commodities according to their Chemical Calorie content, such that the individual can select the commodities according to their Chemical Calorie content,
said certifier optionally using an analyser who determines the presence of xenobiotics in the commodity, and a database provider who provides the Chemical Calorie Rating of said xenobiotics present in the commodity.

The system may also include:

(c) an advisor who advises the individual on selection of commodities according to their Chemical Calorie content, said advisor optionally using an analyser who determines the presence of xenobiotics in the individual, and a database provider who provides the Chemical Calorie Rating of said xenobiotics present in the individual.

The system may also include:

(d) a commodity provider, who provides micronutrient or absorbant supplements for reducing the Chemical Calorie loading of the individual,
(e) a certifier who certifies said supplements according to their ability to reduce the Chemical Calorie loading of the individual, optionally using a database provider who provides the data on the ability of said supplements to reduce the Chemical Calorie loading in the individual.

The invention further relates to methods, compositions, systems, and processes as described in any of the Examples hereinafter, with reference to the tables, figures and flowcharts described herein.

The invention will now be further described with reference to the following non-limiting Figures and Examples. Other embodiments of the invention will occur to those skilled in the art in the light of these.

FIGURES AND TABLES

Fig 1: shows a determination of Chemical Calorie Ratings Chart using 'corrected severities' for Chlormequat and Aldicarb as described in Example 1.

Fig 2: shows a severity calculation chart for Chlormequat as described in Example 1.

Fig 3a: shows a data quality index chart as described in Example 1.

Fig 3b: shows a longevity indices chart as described in Example 1.

Fig 4: shows a determination of Chemical Calorie Ratings Chart using 'raw severities' for Chlormequat and Aldicarb as described in Example 2.

Fig 5: shows a Chemical Calorie Calculation Table for two different items (Mars Bars, Smarties).

Figs 6: shows a list of some pesticides and their effects on different WCS. The results can be used to derive tables such as those shown in Fig 1 and Fig 4.

Fig 7: shows the correlation between chemical production and % of overweight adults in the population.

Fig 8: shows a schematic representation of some of the key Weight Controlling Systems (WCS) of relevance to the present invention.

FLOWCHARTS

Flowcharts 1a,1b: these show (in two parts) a flowchart for determination of the Chemical Calorie Rating of a toxic chemical.

Flowcharts 2a,2b,3: these show, respectively, an item categorization flowchart, a Chemical Calories calculation flowchart, and a data analysis flowchart. The explanatory reference numerals referred to in the flow chart are as follows:

1. Examples include polystyrene cups, which will not themselves be ingested but which will come into direct contact with ingestible items.

2. For example, a polystyrene cup might typically be filled with hot coffee, stirred with a plastic spoon and contain the hot liquid for ten minutes.

3. This refers to items such as carpets and furnishings with which people will come into contact only as part of their general environment.

4. This step depends on whether the user of the invention is trying to ascertain the absolute level of Chemical Calories in the item or just grading whether or not it is low in Chemical Calories.

5. Compare the concentration of each xenobiotic chemical in the item with the maximum allowable for it to be certified 'Low' in Chemical Calories.

6. As shown in Chemical Calories calculation table.

EXAMPLES

Example 1 - Determination of Chemical Calorie Rating (CCR)

A comprehensive study has been carried out on the adverse effects of various pesticides on different key components of the body's Natural Slimming System.

With reference to flowcharts 1a and 1b, the end-result of the CCR determination process is a table showing the Severity of the impact of each Toxic Chemical on each of the WCS. Such a table is called a Determination of Chemical Calorie Ratings Chart. Since some of the WCS are more important than others, each WCS is given a WCS Weighting. The CCR is therefore the sum of the product of each Severity and its Weighting. An example of such a Determination of CCR Chart is shown in Figure 1.

The data in the body of this Determination of CCR Chart are Corrected Severities, measured in Damage Units per unit mass (DU / mg). These numbers are derived from a number of Severity Calculation Charts (one for each Toxic Chemical). An example of a Severity Calculation Chart is shown in Figure 2.

At the top of the Severity Calculation Chart is the name of the Toxic Chemical to which it relates, and the maximum half-life of that chemical in the human body, measured in hours. From the half-life, a Longevity Index is derived from a separate table, the Longevity Indices Conversion Chart which gives the Longevity Index as equal to the Square Root of the Half-Life in Hours. The Longevity Index is related to the time that the Toxic Chemical will remain in the human body, but it is an index rather than a direct measure of time and it therefore has no units.

Also at the top of the Severity Calculation Chart is the Average Concentration used in trials e.g. from literary sources and reports, or from studies carried out for the purpose. This is calculated as the average Actual Concentration used in Trials (for each Trial for which data is available) and is used for those trials for which the Actual Concentration is not available.

The Actual or Average Concentration used in trials are measured either in mg / kg or in ppm (which are identical) i.e. Concentration is the mass used in the Trial (in mg per dose) divided by the mass of the animal (in kg). In turn this can be converted to equivalent human dosage (e.g. by multiplying by an average human weight in kg of 70).

Each Row on the Severity Calculation Chart represents data from one Trial, linking the effects of one Toxic Chemical to one WCS. The data recorded from each Trial is as follows:

Data source (for reference)
Animals used in Trial
Biological Proximity of animals to Humans (score 5 for a trial in Humans, 4 for a trial in Apes, 3 for a trial in Mammals, 1 for a trial in other vertebrates)
The typical mass of these animals (kg)
The mass of the Toxic Chemical used in the Trial (mg / dose)
The Severity of the impact on that WCS of the Toxic Chemical, measured in Damage Units (DU)

The Severity of the impact on the WCS is measured in Damage Units, on a scale from 0 to 10. This is converted to a Severity per unit Mass when it is divided by the Human Equivalent Dosage, which is measured in mg and is based on the Mass of the Toxic Chemical used in the Trial, normalised to a standard Human weight of 70 kg.

This is then weighted towards trials in mammals, apes and especially humans by multiplying this by the Proximity to Humans.

The final data from each trial thus calculated are then added together and multiplied by the Longevity Index and the Data Quality Index.

The Longevity Index reflects the fact that a Toxic Chemical that remains in the body for a long time will do more damage than one that is excreted or metabolised quickly.

The Data Quality Index ensures that a Toxic Chemical has a higher CCR if there a large number of trials that indicate its damaging effects, or if the trials have been done in Humans. The Data Quality Index is calculated in such a way that additional Trials have a major effect if there are few Trials linking a particular Toxic Chemical to a particular WCS, but a small effect if there are already many such Trials, as shown in Figure 3.

The final figure is called the Corrected Severity per Unit Mass, to distinguish it from the Raw Severity data which was the starting point.

This is used in the Determination of CCR Chart to determine the CCR for each Toxic Chemical, in accordance with the weighting given to each of the WCS.

Example 2 - Alternative CCR Determination Process

In an alternative embodiment of the CCR Determination Process, Raw Severity data from trials may be used and there is no need for a Severity Calculation Chart, a Longevity Index or a Data Quality Index. The Raw Severities of Impact of any Toxic Chemical on each WCS are recorded on the CCR Calculation Chart, based on data from a range of trials. Data Quality is included as the number of Trials using any Toxic Chemical that showed any Weight Gain is multiplied by 5 (or 10 if the study was done in Humans) and recorded on the Determination of CCR Chart. The sum of all these Raw Severities and the appropriately factored number of trials is called the Initial Total and is multiplied by the Half-Life in Hours to obtain a CCR. An example of such a Determination of CCR Chart is shown in Figure 4.

Example 3 - Process for Determining the Number of Chemical Calories in an Item

Preferably, the following input data are provided:

Samples of the Item
Full database of Toxic Chemicals and their Chemical Calorie Ratings
Manufacturer's data relating to the Item and its actual composition of Toxic Chemicals
Any third party data available on the Item and its actual composition of Toxic Chemicals
Experience-based database indicating which Toxic Chemicals are most likely to appear in different kinds of samples

The process itself is set out on the accompanying flowcharts (2a,

2b).

The process set out herein for determining the number of Chemical Calories in an item may be applied in substantially similar manner irrespective of the nature of the item e.g. a food item; a fat or blood biopsy sample; a skin-care product; an air sample; an item of furniture; an item of food packaging. However, as will be appreciated by those skilled in the art, the detailed approach needs to be tailored to the nature of the item.

In cases where the required output is a full Chemical Calories Analysis, the output requires a much more detailed format e.g. as shown in the Data Analysis Flowchart 3.

This process involves correlating the concentrations of each Toxic Chemical with the Chemical Calorie Rating of each Toxic Chemical and the Absorption Efficiency of each Toxic Chemical (according to whether the mechanism of absorption is ingestion, inhalation, skin contact or general environmental).

The end result will be a Chemical Calories Calculation Table, showing not only the number of Chemical Calories per kg of the Item and the number of Chemical Calories Absorbed per kg of the Item, but also showing the sources of these numbers to identify the main Toxic Chemicals leading to these results.

Imported lamb meat was found to contain significant amounts of two xenobiotic substances: the organochlorine DDT and the organophosphate Diazinon. In order to obtain the Chemical Calorie content of the meat per kg, the amount of each xenobiotic substance with a high Chemical Calorie Rating present in each kg was multiplied by the respective Chemical Calorie Rating, and the resulting values were then added together.

Example 4 - Determination of Chemical Calorie Loading in the body

A fat sample is obtained from fat recovered in a liposuction procedure and then analysed for various key xenobiotic substances. The Chemical Calorie loading from each substance is then determined

by multiplying the concentration present by the respective Chemical Calorie Rating, and finally the loadings for all the xenobiotic substances are added together.

Example 5 - Micro-nutrient Formulation

The following micro-nutrient preparations were utilised for replacement of Chemical Calorie depleted micro-nutrients active in the Natural Slimming System, and active in disposal of harmful xenobiotics.

Preparation A (1 tablet contains the following substances)

Component	Amount
Vitamin A	2,667 IU
Beta Carotene	3,333 IU
Vitamin B1	32 mg
Vitamin B2	25 mg
Vitamin B3	100 mg
Vitamin B5	60 mg
Vitamin B6	30 mg
Vitamin B12	100 mcg
Vitamin C	260 mg
Vitamin D	400 IU
Vitamin E	100 IU
Folic acid	400 mcg
Calcium	120 mg
Zinc	15 mg
Magnesium	17 mg
Iron	7 mg
PABA	25 mg
Choline Bitartrate	60 mg
Inositol	25 mg
Silica	25 mg
Boron	20 mg
Phytase enzyme	5 mg
Lutein	5 mg
Manganese Ascorbate	2.5 mg
Chromium	200 mcg
Molybdenum Ascorbate	500 mcg

Biotin	400 mcg
L-Selenomethionine	200 mcg
Iodine	150 mcg
Bilberry Extract	50 mg

Preparation B

Component	Amount
Vitamin C	2000 mg

Preparation C

Component	Amount
Magnesium	200 mg

Preparation D

Component	Amount
Co-enzyme Q10	30 mg

Preparation E

Component	Amount
Vitamin E	400 IU

Preparation F

Component	Amount
Vitamin B6	20 mg

Example 6 - Chemical Calorie Absorbent Formulations

The following formulations were utilised for Chemical Calorie absorption:

4 capsules containing pectin (300 mg each) and 4 capsules containing psyllium (500 mg each), to be taken with a minimum of 400 mls of water.

4 capsules containing activated charcoal (500 mg each)

1 teaspoon (5 g) of bentonite clay mixed up with 200 mls fluid (conveniently fruit juice)

Example 7 - Dietary Supplement

The following dietary supplements were utilised for enhancement of the effective functioning of the Natural Slimming System

A. Amino Acid Supplement Tablet

Methionine	250 mg
Taurine	200 mg
Cysteine	500 mg
Tyrosine	500 mg
L-5 Hydroxytryptophan	100 mg
Glutathione	300 mg

B. Liver "Support" Supplement Tablet

Choline	250 mg
Silymarine extract (Milk Thistle)	100 mg
Inositol	100 mg
Sodium Sulphate	100 mg
Lipase	50 mg
Alpha Lipoic Acid	10 mg
Green tea extract	5 mg
Biotin	50 mcg

C. Essential fats

Component	Amount
Linseed oil	10 g
Sunflower oil	2 g

D. Alkalising mineral mixture

Approx. 6 g of the following mixture was taken and mixed in at least 200 mls of water before ingestion.

Component	Amount
Potassium bicarbonate	3.36 g
Magnesium carbonate	0.40 g
Sodium bicarbonate	2.24 g

Example 8 - Chemical Calorie Controlled Diet

The following Chemical Calorie controlled dietary programme was developed for a 140 lb (64 kg) woman.

All the foods eaten should be either organic and/or low in Chemical

Calories. The foods recommended tended to be low in refined sugars, have medium levels of complex carbohydrates, medium levels of proteins, low in saturated fat but high in certain essential fatty acids, high in soluble and insoluble fibre, with medium to high amounts of raw fruit and/or vegetables. During the day a generous amount of pure filtered or distilled or natural water should be consumed (about 1 litre to 3 litres), preferably with added lemon, lime or cucumber to promote alkalisation.

Breakfast:
1 piece of fresh fruit,
25 g of unroasted nuts or seeds (walnuts/almonds/cashew nuts/brazil/pumpkin).

Lunch:
Beans/pulses (150 g of chick peas, quinoa, broad beans, kidney beans other varieties of beans/pulses),
Large mixed salad (the supplement oils can be used as part of a salad dressing).

Dinner:
Lean meat (100 g) or tofu (250 g),
Brown rice (150 g),
Mixed vegetables as many of the allowed vegetables (see foods which can be eaten freely) as required.

Daily allowances:
3 pieces of fresh fruit,
20 g of dried fruit or 125 mls of fruit juice (optional),
up to 200 mls of milk preferably soya or rice milk (optional)
2 slices of bread.

Foods which can be eaten freely:
Vegetable soup or broth (fats not used in cooking).
Most vegetables, preferably eaten raw, except the following vegetables (avocados, potatoes, corn and pulses such as lentils, peas and beans).

Foods which should be avoided include any foods which are likely to

affect the smooth running of the Natural Slimming System such as those with high levels of Chemical Calories (such as fish oils), artificial colours, artificial sweeteners and artificial flavourings; body stimulants such as caffeine or depressants; fats which interfere with the body's ability to use essential fats such as margarines which tend to contain 'hydrogenated polyunsaturated oils' and other hydrogenated vegetable oils.

Example 9 - Slimming Treatment

A female adult (age 35, height 5 ft 4 inches) was maintained on a Chemical Calorie controlled diet based on that of Example 4 for a period of 3 months. A Chemical Calorie absorbent formulation according to example 1 was taken twice daily at least 20 minutes before breakfasting and after dinner at night.

A micronutrient formulation according to Example 2 and a dietary supplement according to Example 3 (excepting the alkalising mineral mixture) were taken twice a day immediately before or after both meals of breakfast and dinner. The alkalising mineral mixture was taken first thing in the morning at a similar time to the Chemical Calorie absorbent, and later in the day if pH testing indicated it was necessary. A Chemical Calorie controlled dietary programme based more or less closely on example 4 was followed during the course of the experimental period.

Bodyweight and size measurements were recorded on a weekly basis and the following changes observed at 30 day intervals over this period.

Results

Day	Weight	Chest	Waist	Hips	% body fat
0	63 kg	90.0 cm	76.0 cm	91 cm	25.6 %
30	60 kg	86.0 cm	69.0 cm	85 cm	21.2 %
60	59 kg	86.0 cm	67.0 cm	84 cm	19 .0 %
90	58 kg	85.5 cm	66.5 cm	80 cm	17.0 %

Example 10 - Slimming Treatment(2)

A 40 year old male of 6ft who has Chemical Calories reduced from his diet and environment, in combination with taking the appropriate supplements experienced a loss in body weight of 10% over 12 months, without making any effort to actively diet. His weight fell from 88kg to 80kg.

Claims

1 A method for determining the extent of the Inhibitory Effect of a target compound on the ability of a test subject into whom said target compound is introduced to control their weight, which method comprises the steps of:
(i) determining the degree or severity by which the target compound affects each of a plurality of weight controlling systems (WCS) present in the test subject;
(ii) determining the persistence of the target compound in the test subject;
(iii) calculating the Inhibitory Effect as a function of values of (i) and (ii).

2 A method as claimed in claim 1 wherein the target compound is one to which the subject may be exposed through ingestion or other uptake from the environment or a metabolite thereof.

3 A method as claimed in claim 2 wherein the target compound is a xenobiotic chemical selected from any of the following classes: pesticides; environmental pollutants; organic solvents; heavy metals.

4 A method as claimed in claim 3 wherein the target compound is a xenobiotic chemical selected from any of the following classes: organochlorine insecticides; organophosphate insecticides; carbamates; phthalates; polychlorinated biphenyls; polybrominated biphenyls; chlorinated hydrocarbon solvents; aromatic hydrocarbons solvents; dioxins; aliphatic, and alicyclic solvents.

5 A method as claimed in any one of the preceding claims wherein the determination for the target compound made in steps (i) and\or (ii) is based on results obtained for a second compound containing same active moiety as the target compound.

6 A method as claimed in any one of the preceding claims wherein the determination for the test subject made in steps (i) and\or (ii) is based on results obtained for one or more representative members of population or sub-population to which the test subject belongs.

7 A method as claimed in any one of claims 1 to 5 wherein the determination for the test subject made in steps (i) and\or (ii) is based on results obtained for a second subject which is a different species to the test subject.

8 A method as claimed in claim 7 wherein method includes the step of weighting the results from the second subject in accordance with its physiological proximity to the first subject.

9 A method as claimed in any one of the preceding claims wherein test subject is human.

10 A method as claimed in any one of the preceding claims wherein the determination made in steps (i) and\or (ii) is not contemporary with the calculation at (iii).

11 A method as claimed in claim 10 wherein the determination made in steps (i) and\or (ii) is given a statistical measure of relevance based on the number of studies or trials used to support the determination.

12 A method as claimed in claim 11 wherein the statistical measure of relevance is obtained from a data quality index chart as shown in Fig 3a.

13 A method as claimed in any one of the preceding claims wherein the determination made in step (ii) is a longevity index which is equal to the square root of the half-life of the target compound in the body of the test subject in hours.

14 A method as claimed in claim 13 wherein the persistence is obtained from a longevity indices conversion chart as shown in Fig 3b.

15 A method as claimed in any one of the preceding claims wherein the determination made in step (i) assessed for at least 2 or 3 of the following WCS: hormonal system; Metabolism; Muscular Activity;

16 A method as claimed in claim 15 wherein any one or more of the

following WCS is assessed: noradrenaline, adrenaline, dopamine, serotonin, GABA, thermoregulation, brown fat metabolism, thyroid hormones, testosterone, oestrogens, progesterone, leutinising hormone (LH) and follicle stimulating hormone (FSH), prolactin, cortisol, insulin, growth hormone and leptin; ATPases; carbohydrate metabolism; lipid metabolism; muscle tissue; protein synthesis; increased food intake; increased percentage of body fat; significant weight gain;

17 A method as claimed in any one of the preceding claims wherein the effect on each WCS is scored on a scale of 0 to 10.

18 A method as claimed in any one of the preceding claims wherein the determination made in step (i) is given a weighting according to the significance of the or each WCS to the test subject's ability to control their weight

19 A method as claimed in any one of the preceding claims wherein the total for each WCS determined at (i) is multiplied by the value determined at (ii) to provide the Inhibitory Effect of the target compound.

20 A method as claimed in any one of the preceding claims wherein the Inhibitory Effect on an average weight test subject is assessed per unit mass of the target compound

21 A method as claimed in any one of the preceding claims substantially as described herein with reference to flowcharts 1a and 1b, and Figures 1 to 4.

22 A method for comparing the relative Inhibitory Effects of a plurality of target compounds on the ability of a test subject to control their weight, which method comprises the steps of:
(i) performing the method of any one of claims 1 to 21 for each target compound, and
(ii) comparing the Inhibitory Effects of each compound.

23 A method for determining the Inhibitory Effect of an item on the ability of a test subject exposed to said item to control their weight, which method comprises at least the step of: (I) determining

the amount, if present, of each of a plurality of target compounds in the item, which target compounds have an Inhibitory Effect on the ability of a test subject to control their weight.

24 A method as claimed in claim 23 wherein the method comprises one, two, or three of the following steps:
(II) determining the Inhibitory Effect of each target compound according to a method of any one of claims 1 to 21, and
(III) determining the degree to which exposure of the test subject to the item will result in introduction into the test subject of each of said plurality of target compounds in the item,
(IV) calculating the Inhibitory Effect of the item as a function of values of (I)-(III).

25 A method as claimed in claim 24 wherein prior to step (i) the item is categorised into categories based on the nature of the target compounds which may be expected to be present in each of said categories.

26 A method as claimed in claim 25 wherein the categories are: foodstuff; skin-care product; air sample; item of furniture; material for food packaging.

27 A method as claimed in any one of claims 23 to 26 wherein prior to step (I) the item is categorised into pre-determined elements based on the nature of the target compounds which may be expected to be present in each of said elements.

28 A method as claimed in any one of claims 23 to 27 wherein the item is analysed only for those target compounds which are believed to be present based on historical analyses.

29 A method as claimed in any one of claims 23 to 28 wherein the sensitivity with which the amount, if present, of each of the plurality of target compounds in the item, is determined is varied according to the Inhibitory Effect of the target compounds whereby higher sensitivity is applied for more inhibitory target compounds.

30 A method as claimed in any one of claims 23 to 28 wherein the

target compounds which are assessed are as follows: PCBs: (2,4,5,2',3',6'-hexa; 2,4,5,2',4',6'-hexa; 2,4,5,2',3',6'-hexa; 2,3,4,5,2',4',5'-hepta; 2,3,4,6,2',3',4'-hepta; 2,3,4,5,3',4',5'-hepta; 2,3,5,6,3',4',5'-hepta); PBBs (2,4,5,3',4'-penta; 2,4,5,2',4',5'-hexa; 2,3,4,2',4',5'-hexa; 2,4,5,3',4',5'-hexa; 2,3,5,2',4',5',6'-hepta); organochlorine Pesticides (DDT; DDE; HCB; Oxychlordane; trans-Nonachlor; β-BHC (lindane); Heptachlor epoxide; Dieldrin); Heavy metals (Lead; Cadmium).

31 A method as claimed in any one of claims 26 to 30 wherein the item is a foodstuff.

32 A method as claimed in claim 31 wherein the foodstuff is categorized into the following elements: integral packaging; non-ingestable portions; types of ingestable material.

33 A method as claimed in claim 31 or claim 32 wherein the degree to which exposure of the test subject to the item will result in introduction into the test subject of each of said plurality of target compounds in the item is based upon ingestion and absorption factors of the item in question.

34 A method as claimed in any one of claims 31 to 33 wherein the Inhibitory Effect is declared for 100g or 100 ml of the foodstuff and\or a typical portion of said foodstuff.

35 A method as claimed in any one of claims 24 to 30 wherein the item is packaging for food, its Inhibitory Effect is assessed by comparing the Inhibitory Effect of a foodstuff packaged in said item with an equivalent unpackaged foodstuff.

36 A method as claimed in any one of claims 24 to 35 wherein the function in step (IV) is given by the totality for each target compound of the value determined at (I) multiplied by the value determined at (II) factored by the value determined at (III) such as to provide the total Inhibitory Effect of the item.

37 A method as claimed in any one of claims 24 to 36 wherein the method is for establishing that the Inhibitory Effect of the item

does not exceed a minimum threshold.

38 A method as claimed in any one of claims 24 to 37 which comprises the further step of categorising or banding said items based on a pre-determined scale of Inhibitory Effect.

39 A method as claimed in any one of claims 24 to 38 substantially as described herein with reference to flowcharts 2a, 2b and 3

40 A method for comparing the relative Inhibitory Effects of a plurality of items on the ability of a test subject exposed to said items to control their weight, which method comprises the steps of:
(i) performing the method of any one of claims 24 to 37 for each item, and
(ii) comparing the Inhibitory Effects of each compound.

41 A method for labelling and\or certifying an item according to its Inhibitory Effect on the ability of a test subject exposed to said item to control their weight, which method comprises the steps of:
(i) performing the method of any one of claims 24 to 37 for the item, and
(ii) labelling and\or certifying the item based on a pre-determined scale according to their Inhibitory Effect.

42 A method as claimed in claim 41 wherein the pre-determined scale is Very low; Low; Medium; High; Very high.

43 A method as claimed in claim 42 or claim 43 wherein the labelling and\or certifying is performed by means of incorporating information conveying the Inhibitory Effect into the item, its packaging, or ancillary materials associated therewith.

44 A method as claimed in any one of claims 24 to 39, or 41 to 43 wherein the Inhibitory Effect is determined for a representative item selected from a batch of items.

45 A method for determining the extent to which a test subject has had their ability to control their weight inhibited, which method

comprises the steps of: (I) determining the amount, if present, of each of a plurality of target compounds in the test subject, which compounds have an Inhibitory Effect on the ability of a subject to control their weight.

46 A method as claimed in claim 45 wherein the method comprises the further steps of:
(II) determining Inhibitory Effect of each target compound present according to a method of any one of claims 1 to 21, and
(III) calculating the Inhibitory Effect of the item as a function of values of (I)-(II).

47 A method as claimed in claim 45 or claim 46 wherein the value for step (I) is determined from a biopsy sample removed from the test subject.

48 A method as claimed in any one of claims 45 to 47 wherein the function in step (III) is given by the totality for each target compound of the value determined at (I) multiplied by the value determined at (II).

49 A method of diagnosis and\or prognosis of a weight-control related disorder or disease in a test subject, which method comprises the steps of:
(i) performing a method according to any one of claims 45 to 48,
(ii) correlating the results obtained from said method with the disease state of the subject.

50 A method of determining a test subject's progress in altering the extent to which their ability to control their weight has been inhibited, which method comprises the steps of:
(i) performing a method according to any one of claims 45 to 48 at intervals,
(ii) comparing the results obtained from said method to establish the progress made.

51 A method of producing a tailored advice plan for a subject, which plan provides a system for improving or maintaining the ability of the subject to control their weight, which method comprises the

steps of:
(i) performing a method according to any one of claims 45 to 48,
(ii) providing a plan in accordance with the results obtained from said method.

52 A composition adapted to reduce the effect of one or more target compounds present in a test subject, which target compounds inhibit the ability of the test subject to control their weight, which composition comprises one or more active compounds which are micronutrients or target compound absorbants and which (i) reduce the level of said target compounds in said test subject and\or (ii) counteracts the inhibition caused by said target compounds.

53 A composition as claimed in claim 52 which is a dietary supplement

54 A composition as claimed in claim 53 which is presented as one or more discrete units as capsules, cachets, tablets or lozenges, each containing a predetermined amount of the active compounds; as a powder or granules; or a solution or suspension in an aqueous or non-aqueous liquid such as a syrup, an elixir, an emulsion or a draught.

55 A composition as claimed in any one of claims 52 to 53 which is combined with food components for oral ingestion.

56 A composition as claimed in any one of claims 52 to 55 which includes an alkalisation supplement to adjust the pH balance in the body of the test subject.

57 A composition as claimed in any one of claims 52 to 56 comprising at least the following micro-nutrients selected from: methionine, glutathione, tyrosine, tryptophan or L-5 Hydroxytryptophan.

58 A composition as claimed in claim 57 further comprising one or more micro-nutrients selected from the following vitamins, minerals or fatty acids: vitamins A, B1, B2, B6, magnesium, zinc; vitamin C, E; vitamins B3, B12, magnesium, zinc, iron and omega-3-acid.

59 A composition as claimed in any one of claims 52 to 58 further comprising one or more micro-nutrients selected from: co-enzyme Q10, vitamin B5, iodine, choline, folic acid.

60 A composition as claimed in any one of claims 57 to claim 59 further comprising one or more micro-nutrients selected from: biotin, bethaine, inositol, vitamin D, lipoic acid, phosphatidyl choline, calcium, organic sulphur, copper, chromium, selenium, manganese, vanadium, molybdenum, boron, PABA (para-aminobenzoic acid), vitamin K and silicon.

61 A composition as claimed in any one of claims 57 to claim 60 further comprising one or more of: further amino acids, further essential fatty acids, phytonutrients, herbal detoxification remedies, hormone balancing herbs, alkalising substances or enzymes.

62 A composition as claimed in claim 61 comprising one or more amino acids selected from: isoleucine, leucine, valine, lysine, phenylalanine, threonine, ethanolamine, glycine, serine, glutamine, glutamic acid, aspartic acid, arginine, histidine, alpha-ketoglutaric acid, alanine, asparagine, proline, carnitine, butyric acid, butyrates;

63 A composition as claimed in claim 61 or claim 62 comprising an omega-6 essential fatty acid.

64 A composition as claimed in any one of claims 61 to 63 comprising one or more of anthocynanidins, cysteine, and taurine.

65 A composition as claimed in any one of claims 61 to 64 comprising one or more phytonutrients selected from: bioflavonoids, curcumin, catechins, lycopene, lutein, zeanxanthin, allium compounds, capsaicin, coumarins, chlorophyll, ellagic acid, sulphoraphane, isothiocyanate, anthocyanins, proanthocyanins, phenolic acids, quercitin, monoterpenes, liminoids, terepenes, indoles, allyl sulphides, carotenoids, saponins.

66 A composition as claimed in any one of claims 61 to 65 comprising one or more herbal extracts selected from: milk thistle,

burdock, red clover, fenugreek, echinacea, yellow dock, dandelion root, ginkgo biloba, blessed thistle, ginger root, sarsaparilla root, plantain leaf, saw palmetto berry, corn silk, fructo-oligosaccharides, garcinia cambogia, oligosaccharides, flax meal, elecampane root, schisandra berry, elderberry, cloves, cat's claw, black walnut hull, goldenseal root, barley bran, wheat bran, tumeric, aloe vera, hibiscus, echinacea, fenugreek, dong quai, astragalus root, micro algae, melatonin, pinus maritima, kelp, slippery elm, sorrel, marshmallow root, fennel seed, barberry rootbark, senna, curacao, cascara sagrada, green tea, African bird pepper, cayenne and probiotics; licorice root, ginseng, isoflavones, genistein, chaste tree berry, triphala, black cohosh, wild yam, saw palmetto, damiana.

67 A composition as claimed in any one of claims 61 to 66 comprising one or more enzymes selected from: lipase, protease, amylase, phytase, trypsin, chymotrypsin, lactase, catalase, superoxidase dismutase and glutathione peroxidase.

68 A composition as claimed in any one of claims 52 to 67 comprising one or more target compound absorbents selected from: charcoal; soluble fibre optionally selected from psyllium, locust bean gum, oat bran and/or oat gum, konjac mannan, pectin, guar gum, acacia gum, rice bran; clay optionally selected from: bentonite, kaolin, and Fuller's earth.

69 A composition as claimed in any one of claims 52 to 68 further comprising one or more target compound absorbents selected from: ion exchange resin; mineral oil; sucrose polyester; a chelating agent; squalene and squalane; chitin and other poliglusams.

70 A composition as claimed in any one of claims 52 to 69 wherein the micronutrients or target compound absorbants are present in two or more discrete dosage units in a composition of matter.

71 A composition as claimed in any one of claims 52 to 70 wherein the dosage for any of the following components present in the composition are within the following ranges of preferred or desirable minimum dose to preferred upper limit:

Micronutrient	Preferred minimum dose	Desirable Minimum dose	Preferred Upper limit
Vitamin A	3,000 IU	10,000 IU	25,000 IU
Vitamin B1	10 mg	50 mg	500 mg
Vitamin B2	10 mg	50 mg	300 mg
Vitamin B3	20 mg	50 mg	400mg
Vitamin B5	20 mg	50 mg	1,000 mg
Vitamin B6	20 mg	100 mg	500 mg
Vitamin B12	20 mcg	100 mcg	1,000 mcg
Folic acid	200 mcg	400 mcg	1,000 mcg
Choline	100 mg	300 mg	1,000 mg
Vitamin C	500 mg	3,000 mg	20,000 mg
Vitamin E	100 IU	400 IU	1,400 IU
Co-enzyme Q10	20 mg	40 mg	1,000mg
Magnesium	200 mg	400 mg	2,000 mg
Zinc	10 mg	20 mg	200 mg
Iron	5 mg	20 mg	200 mg

	Preferred minimum dose	Desirable Minimum dose	Preferred Limit
Non-citrus Anthocyanidin complex (bilberry extract)	20 mg	25 mg	1000 mg
Tryptophan or L-5	50 mg	200 mg	4000 mg
Hydroxytryptophan	50 mg	100 mg	300 mg
Tyrosine	200 mg	500 mg	3000 mg
Methionine	100 mg	500 mg	3000 mg
Cysteine	100 mg	500 mg	4000 mg
Taurine	100 mg	300 mg	4000 mg
Glutathione	150 mg	500 mg	4000 mg

Omega-3 fatty acids(from linseed oil)	4 g	20 g	150 g

Absorbent	**Preferred minimum dosage**	**Desirable minimum dosage**	**Preferred upper limit**
Activated charcoal	500 mg	2 g	20 g
Soluble fibre (e.g. pectin)	1 g	3 g	30 g
Clay (e.g. bentonite)	1 g	5 g	30 g

72 A composition as claimed in claim 71 where the components are present at the desirable minimum dose, or a dosage which is between 100% to 600%, preferably from 100% to 300%, more preferably 200% of the desirable minimum dose.

73 A composition as claimed in any one of claims 52 to 72 comprising the following dosage unit preparations A-F:

Component	Amount
Vitamin A	2,667 IU
Beta Carotene	3,333 IU
Vitamin B1	32 mg
Vitamin B2	25 mg
Vitamin B3	100 mg
Vitamin B5	60 mg
Vitamin B6	30 mg
Vitamin B12	100 mcg
Vitamin C	260 mg
Vitamin D	400 IU
Vitamin E	100 IU
Folic acid	400 mcg
Calcium	120 mg
Zinc	15 mg

Magnesium	17 mg
Iron	7 mg
PABA	25 mg
Choline Bitartrate	60 mg
Inositol	25 mg
Silica	25 mg
Boron	20 mg
Phytase enzyme	5 mg
Lutein	5 mg
Manganese Ascorbate	2.5 mg
Chromium	200 mcg
Molybdenum Ascorbate	500 mcg
Biotin	400 mcg
L-Selenomethionine	200 mcg
Iodine	150 mcg
Bilberry Extract	50 mg

Preparation B

Component	Amount
Vitamin C	2000 mg

Preparation C

Component	Amount
Magnesium	200 mg

Preparation D

Component	Amount
Co-enzyme Q10	30 mg

Preparation E

Component	Amount
Vitamin E	400 IU

Preparation F

Component	Amount
Vitamin B6	20 mg

74 A composition as claimed in any one of claims 52 to 72 comprising the following dosage unit preparations A-C in conjunction

with an alkalising mineral mixture:

A. Amino Acid Supplement Tablet

Methionine	250 mg
Taurine	200 mg
Cysteine	500 mg
Tyrosine	500 mg
L-5 Hydroxytryptophan	100 mg
Glutathione	300 mg

B. Liver "Support" Supplement Tablet

Choline	250 mg
Silymarine extract (Milk Thistle)	100 mg
Inositol	100 mg
Sodium Sulphate	100 mg
Lipase	50 mg
Alpha Lipoic Acid	10 mg
Green tea extract	5 mg
Biotin	50 mcg

C. Essential fats

Component	Amount
Linseed oil	10 g
Sunflower oil	2 g

75 A method of controlling the weight of a subject, which method comprises the steps of administering to the subject following: (a) a dietary plan of foods the Inhibitory Effect of which has been assessed according to a method as claimed in any one of claims 31 to 39, (b) a composition as claimed in any one of claims 52 to 74.

76 A method as claimed in claim 75 wherein the composition as claimed in any one of claims 52 to 74 is orally administered to or by the subject until a beneficial loss of body weight has occurred.

77 A method for cosmetic improvement of a subject, which subject does not suffer from obesity, the method comprising performing a method as claimed in claim 75.

78 A method of treatment of a subject suffering from obesity, which method comprises the method comprising performing a method as claimed in claim 75.

79 A method of improving the bodily appearance of a subject, which method comprises administering a composition as claimed in any one of claims 52 to 74 to the subject.

80 A composition as claimed in any one of claims 52 to 79 for use in a method of treatment of obesity.

81 Use of a composition as claimed in any one of claims 52 to 79 in the preparation of a medicament for the treatment of obesity.

82 A system for improving or maintaining the ability of a subject to control their weight, which system includes:
(a) a commodity provider, who provides commodities for the subject,
(b) a certifier who certifies each commodity according to its Inhibitory Effect on the ability of a test subject exposed to said item to control their weight in accordance with a method of any one of claims 23 to 39, such that the subject can select each commodity according to its certification,
said certifier optionally using an analyser who determines the presence of target compounds in each commodity, and a database of the Inhibitory Effect of the target compounds present in the commodity on the ability of the test subject to control their weight, which inhibitory effect is determined in accordance with a method of any one of claims 1 to 21.

83 A system as claimed in claim 82 which optionally further includes:
(c) an advisor who advises the individual on selection of each commodity according to its Inhibitory Effect on the ability of a test subject exposed to said item to control their weight, said advisor optionally using an analyser who determines the presence of target compounds in the subject according to any one of claims 45 to 48.

84 A system as claimed in claim 82 or claim 83 which optionally

further includes:
(d) a commodity provider, who provides compositions as claimed in any one of claims 52 to 74 for reducing the level of said target compounds in said subject according to any one of claims 45 to 48, plus optionally
(e) a certifier who certifies said compositions according to their ability to reduce the level of said target compounds in said subject.

85 A method of producing a database of the Inhibitory Effects of a plurality of target compounds on the ability of a test subject to control their weight, which method comprises the steps of:
(i) performing the method of any one of claims 1 to 23 for each target compound, and
(ii) combining the results into a database.

86 A method of producing a database of the Inhibitory Effects of a plurality of items on the ability of a test subject exposed to said items to control their weight, which method comprises the steps of:
(i) performing the method of any one of claims 24 to 37 for each item, and
(ii) combining the results into a database.

87 A database produced by the method of claim 85 or claim 86.

88 A data carrier comprising containing a database of claim 87.

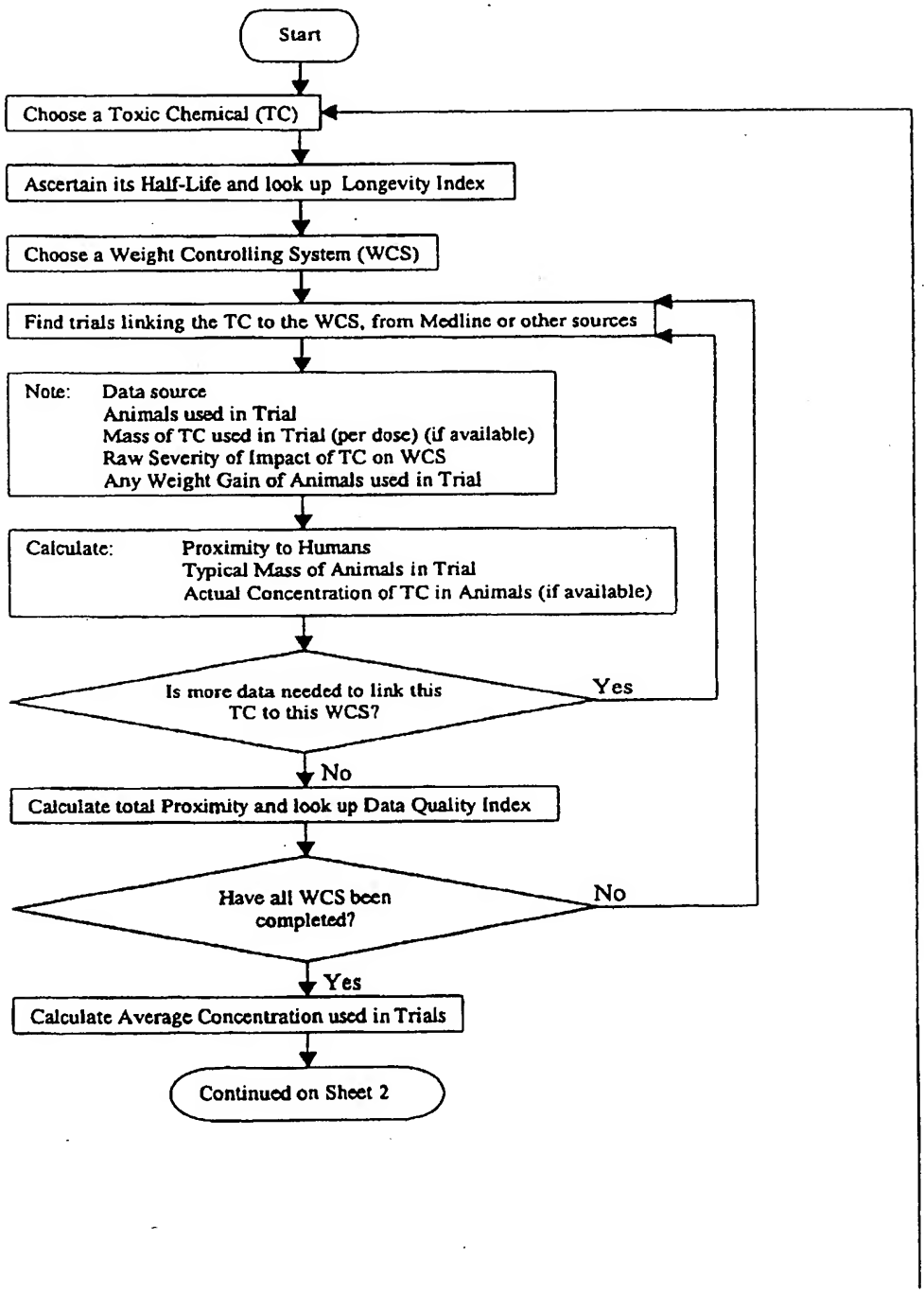
89 A computer system for use in the performance of a method as claimed in any one of claims 1 to 51, or displaying the output of said method, or displaying or accessing the database of claim 87, which computer system comprises (a) a standard electronic computer circuit containing at least a random access memory, a read only memory, a processor; (b) a keyboard comprising a plurality of standard keyboard buttons (c) a display.

90 A process for producing a labelled and\or certified item, which item if labelled and\or certifyied according to its Inhibitory Effect on the ability of a test subject exposed to said item to control their weight, which process comprises the steps of:

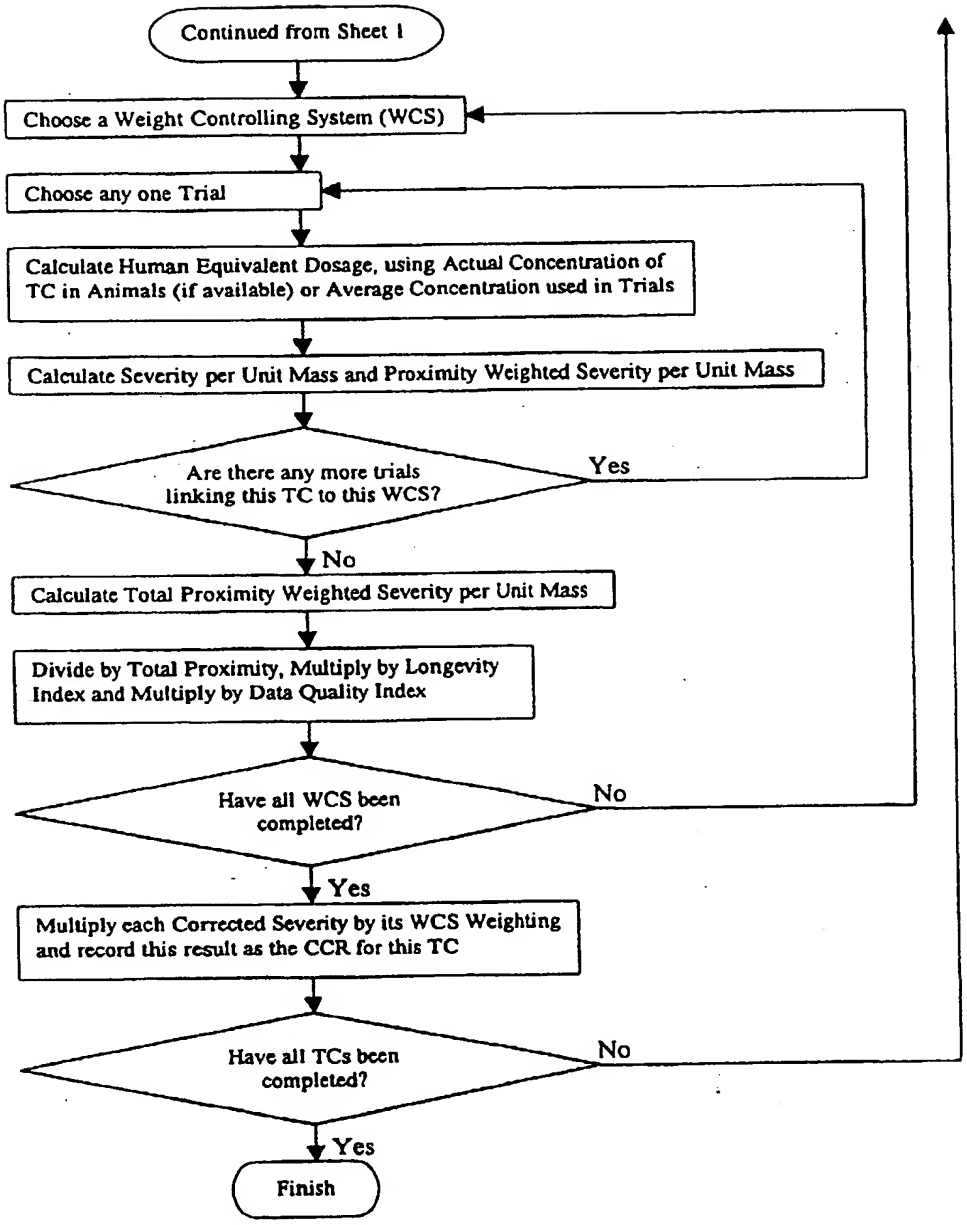
(i) providing an item to be labelled and\or certified,

(ii) performing a method as claimed in any one of claims 41 to 43 on said item.

Flowchart for Determination of Chemical Calorie Rating of a Toxic Chemical

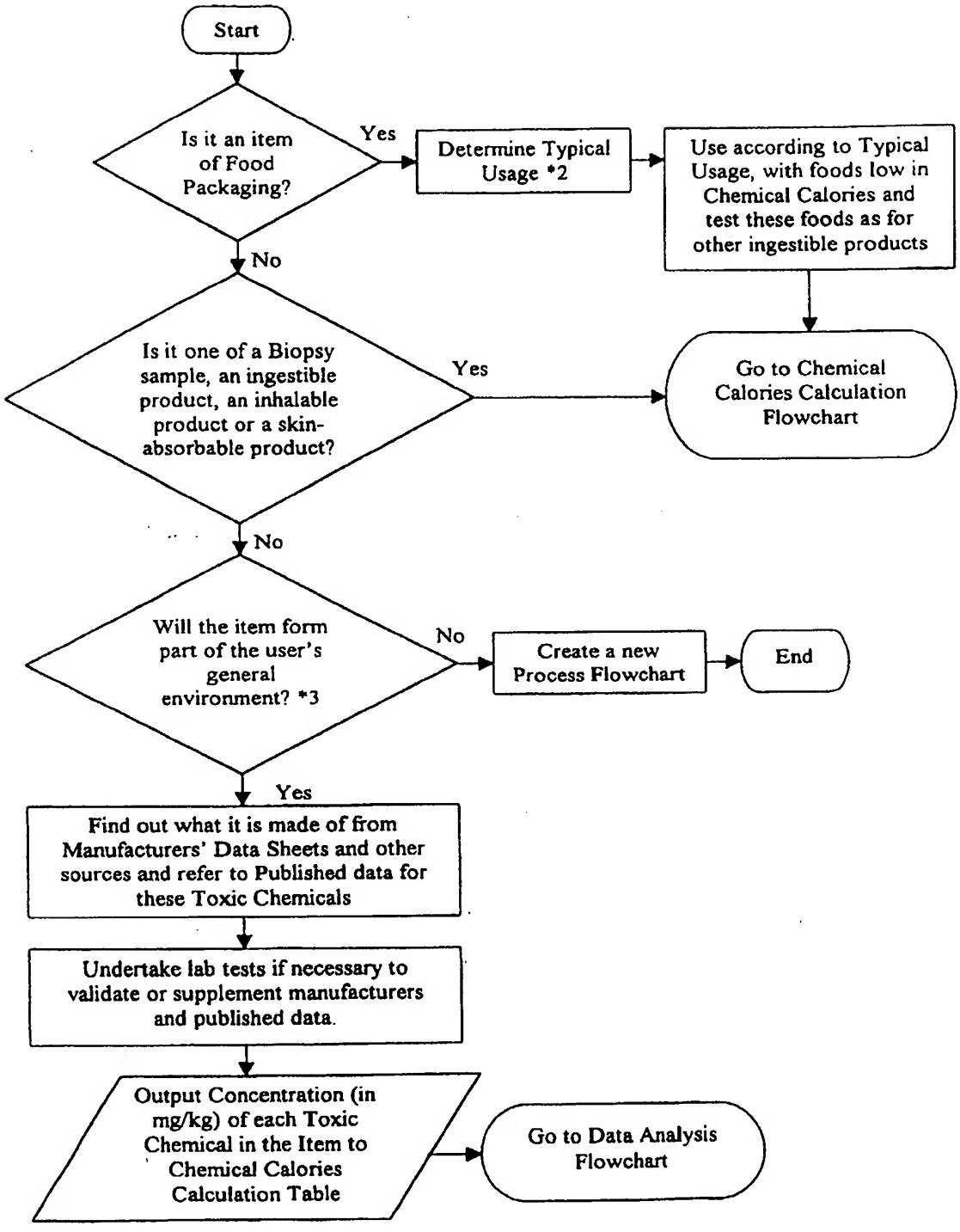


Flowchart 1a



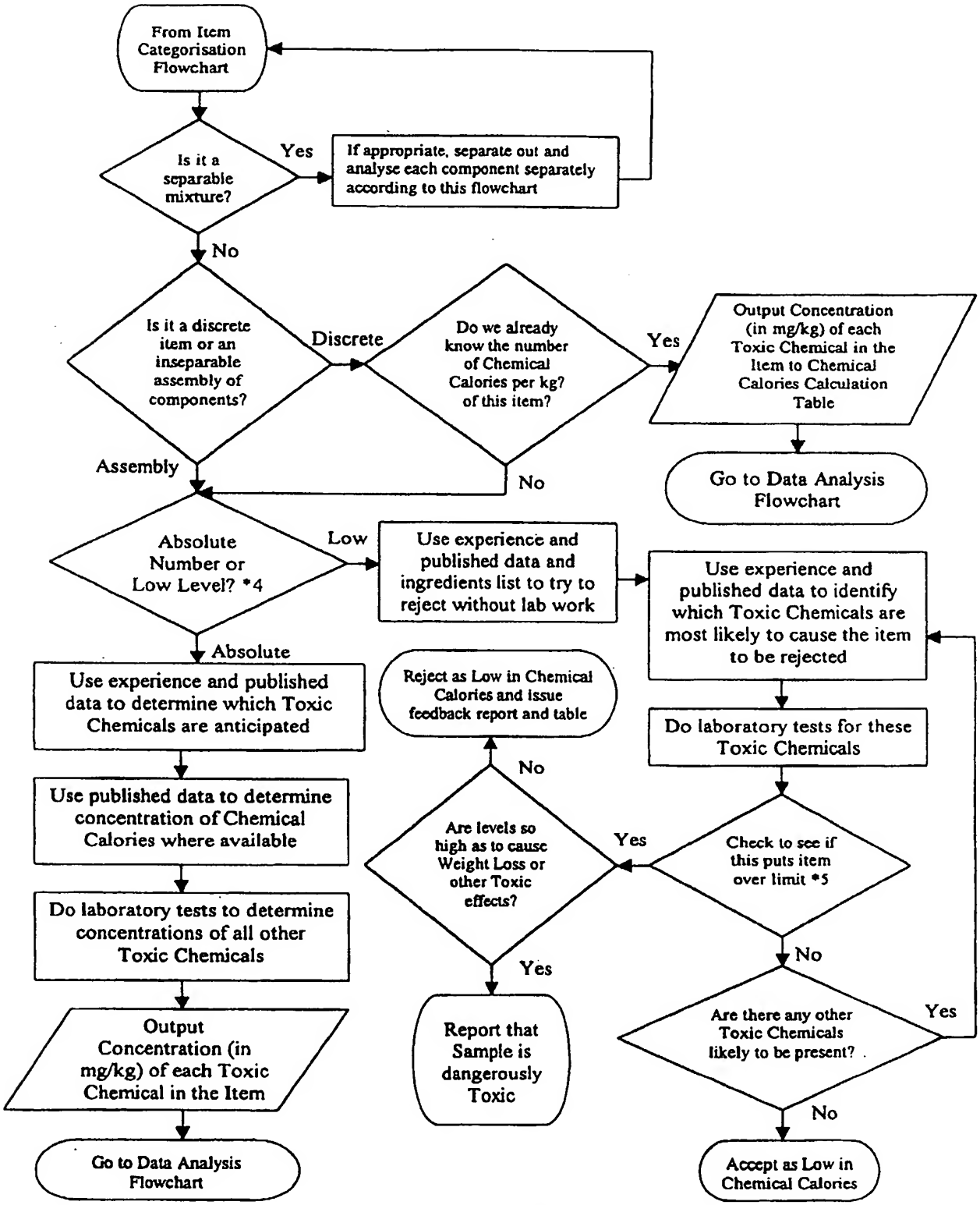
Flowchart 1b

Item Categorisation Flowchart



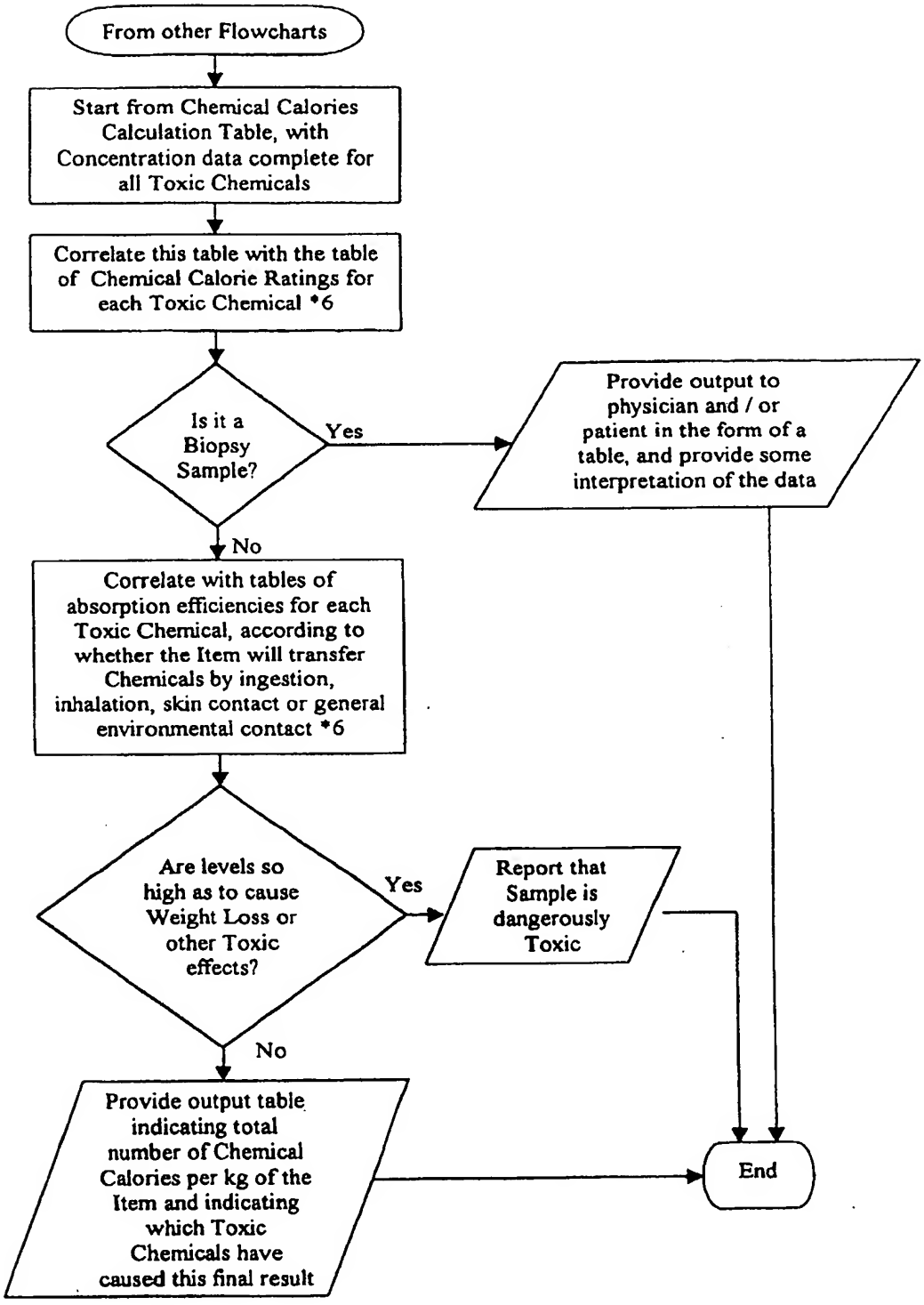
Flowchart 2a

Chemical Calories Calculation Flowchart



Flowchart 2b

Data Analysis Flowchart



Flowchart 3

INVESTOR IN PEOPLE

Application No:	GB 0117052.1	**Examiner:**	Dr Annabel Ovens
Claims searched:	1-44, 46, 47 in part, 48, 49-51 in part, 85-88 and 90	**Date of search:**	12 February 2002

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): A5B (BR)

Int Cl (Ed.7): A61K 49/00

Other: Online: PAJ, EPODOC, WPI, BIOSIS, CAS-ONLINE

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	WO 98/20158 A1 (SMITHKLINE BEECHAM)	
A	US 5908609 (MILLENNIUM PHARMACEUTICALS)	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Application No: GB 0117052.1 **Examiner:** Dr Annabel Ovens
Claims searched: 52-81 **Date of search:** 13 March 2002

Patents Act 1977
Further Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): A5B

Int Cl (Ed.7): A61K 35/78

Other: Online: PAJ, EPODOC, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2180747 A (KREITZMAN) see whole document	52 at least
X	EP 0930019 A2 (LOTTE) see whole document	52 at least
X	EP 0803202 A2 (SIRC) see whole document	52 at least
X, E	WO 01/93700 A1 (SUN NUTRITION) 13.12.01 (see whole document and also WPI abstract Accession No. 2002:057320/08)	52 at least
X	DE 29620015 U1 (NUTREND) 09.01.97 (see whole document and also WPI abstract Accession No. 1997:067166/07)	52 at least
X	WPI Abstract Accession No. 2000:379022/33 & JP 2000103742 A (KENJI ET AL.) 11.04.00 (see abstract)	52 at least
X	WPI Abstract Accession No. 2000:379021/33 & JP 2000103741 A (KENJI ET AL.) 11.04.00 (see abstract)	52 at least
X	WPI Abstract Accession No. 1999:543930/46 & JP 110228431 A (ASAHI) 24.08.99 (see abstract)	52 at least
X	WPI Abstract Accession No. 1999:002469/01 & JP 100262606 A (NAGASE) 06.10.98 (see abstract)	52 at least

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.
& Member of the same patent family
A Document indicating technological background and/or state of the art.
P Document published on or after the declared priority date but before the filing date of this invention.
E Patent document published on or after, but with priority date earlier than, the filing date of this application.

Application No: GB 0117052.1 **Examiner:** Dr Annabel Ovens
Claims searched: 52-81 **Date of search:** 13 March 2002

Category	Identity of document and relevant passage	Relevant to claims
X	WPI Abstract Accession No. 1997:539685/50 & JP 090227398 A (ZERIA) 02.09.97 (see abstract)	52 at least
X	WPI Abstract Accession No. 1996:439486/44 & JP 080217689 A (POLA) 27.08.96 (see abstract)	52 at least

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

INVESTOR IN PEOPLE

Application No:	GB 0117052.1	**Examiner:**	Dr Annabel Ovens
Claims searched:	45 and 47 and 49-51 in part	**Date of search:**	11 March 2002

Patents Act 1977
Further Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): A5B (BB, BC, BD, BR, BS, BT)

Int Cl (Ed.7): A61K 49/00; A61P 3/04

Other: Online: PAJ, EPODOC, WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
	NONE	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.